FIELD DISTRIBUTION AND ENTRAINMENT OF FISH LARVAE AND EGGS AT THE DONALD C. COOK NUCLEAR POWER PLANT, SOUTHEASTERN LAKE MICHIGAN,

1973-1979

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INTRODUCTION

PURPOSE OF THE STUDY

Mortality induced by entrainment of fish eggs and larvae and impingement of juvenile and adult fishes may be the most important biological influence power generating plants exert on nearshore fish populations. These impacts clearly overshadow thermal discharge effects. Entrainment could significantly affect local Lake Michigan fishes by reducing the reproductive potential of important forage or gamefish populations. Because of this potential impact of the Cook Plant, we have intensively documented species, sizes, and numbers of fish larvae and eggs entrained at the plant from 1975 to 1979. In this report we attempt to identify, interpret, and predict the effects of fish larva and egg entrainment on southeastern Lake Michigan's nearshore fish populations.

Schubel and Marcy (1978) defined two forms of entrainment; intake or pump entrainment and plume entrainment. Intake entrainment is the capture and inclusion of organisms, in our case - fish eggs and larvae, into water used for condenser cooling. Plume entrainment is the attraction or mixing of adults and larvae from lake water near the discharge into the thermal plume. We did not sample plume-entrained eggs or larvae because of difficulties encountered in adequately and safely collecting organisms from this area. Effects of plume entrainment on adults are discussed in the adult and juvenile fish report (see Tesar et al. 1984). In this report, entrainment, unless otherwise noted, will refer specifically to intake entrainment.

To more clearly define the effects of entrainment on southeastern Lake Michigan's fish community, we must (in addition to documenting species, sizes, and numbers entrained) relate those losses to the distribution, abundance, and life cycles of fishes near the Cook Plant and assess the associated effects on individual fish populations and community structure. The ultimate effect of entrainment losses will be dictated by the system's "resiliency," i.e., environmental stability, productivity, population compensation, and the ecological and economic importance of individual species. To attain these goals, we conducted field studies to identify the species, sizes, numbers, spatial distribution, and seasonal occurrence of adult fish, fish larvae, and eggs near the Cook Plant.

Most fishes in our study areas have similar seasonal movement patterns, most often related to spawning activity. They move inshore for spawning in early spring or summer where some

species remain until moving into deeper water in the fall. Salmon, trout, and coregonids differ from this basic pattern and are usually present during spring, fall, and upwellings. Entrainment losses usually peak during and shortly following spawning and are sporadic thereafter. Mortality of eggs and larvae during entrainment is the result of a combination of mechanical, thermal, and chemical stresses.

STUDY AREA

The Donald C. Cook Nuclear Power Plant occupies part of a 263-ha site on the southeast shore of Lake Michigan that includes approximately 1,326 m of sand dunes shoreline. The plant is located approximately 3.2 km northeast of Bridgman, Michigan, in Lake Township, Berrien County (Fig. 1).

With both reactors on line, the Cook Plant has a generating capacity of 2,200 megawatts of electricity. The plant utilizes a once-through cooling system capable of a maximum service water flow rate of 104 m³/s to dissipate an estimated heat rejection rate of 3 X 10½ calorie g/h (AEC 1973). Condenser design modifications account for differential flow rates for Unit 1 (45 m³/s) and Unit 2 (59 m³/s). Temperature increases (Δ T) over ambient lake water temperatures are 12.1C° (Unit 1) and 9.3C° (Unit 2) at maximum generating capacity (AEC 1973). Decreased flow rates and slightly increased Δ Ts occur in winter when heated water is pumped back through the intake structures via one of the three intake pipes to reduce ice formation.

Water for both condenser units is drawn from Lake Michigan through three intake structures 686 m offshore in 7.3 m of water (mean lake level - 176.5 m above sea level). Intake structures rest on a concrete and riprap base structure approximately 2 m above lake bottom. Intake openings, protected by a series of steel guard racks, are an additional 2.5 m above the base. Therefore, intake water is drawn from the 2- to 5-m strata of the water column. Three intake pipes with diameters of 4.9 m are buried in the lake bottom and covered by at least 0.6 m of sand (AEC 1973). Estimated water velocity at the intake grills (20 X 20-cm openings) is approximately 0.4 m/s during normal conditions and 0.6 m/s during winter de-icing operations. In the intake pipes, water velocity increases to 1.8 m/s during normal conditions (AEC 1973). Cooling water travels through the intake pipes to a common screenhouse where the seven circulating water pumps are located (Figs. 2 and 3).

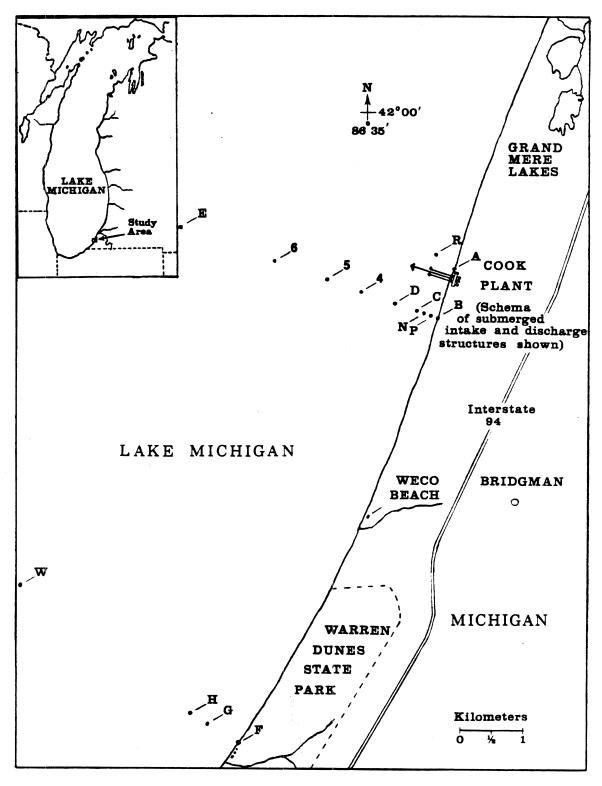


Figure 1. Map of southeastern Lake Michigan, showing locations of the D. C. Cook Plant and our field fish larvae sampling stations.

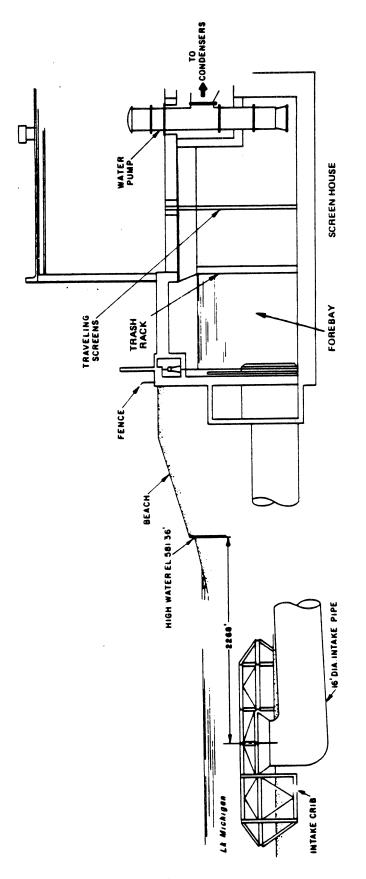


Figure 2. Scheme of the intake crib and screenhouse at the D. C. Cook Plant, southeastern Lake Michigan. Adapted from AEC (1973).

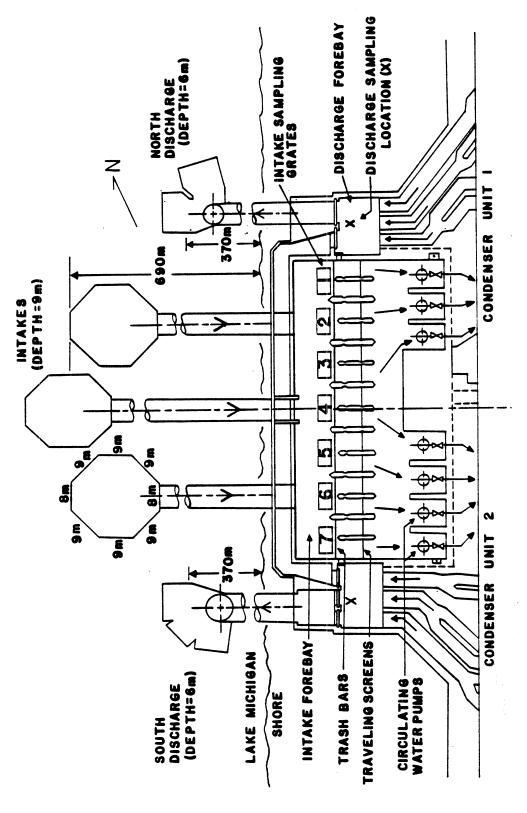


Figure 3. Diagram of the screenhouse and the plant's intake-discharge pipes in Lake Michigan. Also shown are the traveling screens, circulating water pumps, and forebay grates where entrainment sampling was conducted.

Water then passes through vertical trash racks (6 to 7-cm openings, 0.3 m/s water velocity) and vertical traveling screens (0.95-cm square openings, 0.6 m/s water velocity) to circulating water pumps and condensers. Heated water is discharged via two buried pipes (4.9-m diameter). Discharge structures are 91 m apart and 366 m offshore in 5.5 m of water. Water is discharged through slot-jet diffusers at a high rate (6,202 m³/min) which rapidly mixes heated and ambient water. The effluent plume has an estimated area during two-unit operation of 230 ha within the 1.7C° Δ T (3F°) isotherm (AEC 1973). A more detailed discussion of intake and discharge structures may be found in Jude et al. (1979), AEC (1973), and Indiana & Michigan Electric Company (IMEC) (1977, 1979). Cooling water passage time from intake at the 7.3-m contour in Lake Michigan to discharge at the lake's 5.5-m contour is approximately 10 min; duration of condenser passage is about 6 s (AEC 1973).

METHODS

FIELD LARVAE

Sampling

Fish larvae were collected with a conical, 0.5-m diameter, nylon plankton net of no. 2 $(363-\mu\text{m})$ mesh. A Rigosha flowmeter attached to the center opening of the net measured volume of water sampled. When flowmeters failed to function, the average of flowmeter values from the remaining tows at the same station or from stations of comparable depth were substituted. Flowmeter readings were converted to volume filtered by use of the calibration method described in Jude et al. (1979b).

Duplicate surface tow samples were collected at beach seining stations A (north Cook), B (south Cook), and F (Warren Dunes). A net was towed by hand, just below the water surface, against the current for a distance of about 61 m once during the day and once at night. Beach tows were performed once a month, April through November.

Horizontal, 5-min tows from the R/V Mysis at speeds of 3-6 km/h at discrete depths parallel to shore along three transects in Lake Michigan were conducted. The transects were at Warren Dunes, including stations F (1 m, i.e., beach), G (6 m), H (9 m), and W (21 m); south Cook, with stations B (1 m), C (6 m), D (9 m), and E (21 m); and north Cook, with stations A (1 m) and R (6 m) (Fig. 1). Open water tows were performed both day and night, once per month, April through September. For 6-m stations, tows were done at 0.5, 2, 4, and 5.5 m; for 9-m stations, depths were 0.5, 2.5, 4.5, 6.5, and 8.5 m; and for 21-m stations, tows were done at 0.5, 7.5, 13.5, and 20 m. Tow depths and durations differed slightly in 1973 as tows were conducted at 0, 1, and 2 m and a steptow was also performed from the bottom to the surface; see Jude et al. (1979b) for details. Stations R (6 m, north Cook) and W (21 m, Warren Dunes) were not sampled in 1973 or Station M (6 m, off St. Joseph River) was sampled in 1973 only and south Cook stations N (3 m), 4 (12 m), 5 (15 m), and 6 (18 m) were sampled in 1976 only.

The procedure for deepwater tows was as follows:

1) Plankton net with attached Mason jar and depressor lowered to desired depth on end of cable.

- 2) Plankton net towed horizontally for 5 min starting at the desired depth, which was obtained by measuring cable angle and trigonometrically calculating the length of cable to be released to reach desired depth.
- 3) Plankton net hauled to surface and washed with a water hose.
- 4) Contents rinsed into the Mason jar, preserved with 40 mL of buffered formaldehyde, labelled, and sealed.

Fish larvae samples were collected from the lake bottom using a benthic sled (Yocum and Tesar 1980) equipped with a flowmeter. A no. 2, $363-\mu m$ mesh net mounted in a rectangular frame sampled within 5 cm of bottom. Tows were performed once during the day and once at night at beach stations A, B, and F, and open water stations C, D, N, and P during regular monthly sampling periods in 1974. See Jude et al. (1979b) for details of sampling procedure.

Total numbers of larvae and eggs captured in all subsurface tows were adjusted to compensate for upper strata contamination. For details of calculation see Jude et al. (1979b). Numbers of eggs and larvae were converted to densities, i.e., number/1,000 m 3 , for all analyses. About 35 m 3 of water were filtered in most tows.

Statistical Analyses

Analysis of variance (ANOVA)($\alpha = 0.01$) was applied to larval fish density data (no./1,000 m³) of three species: alewife, yellow perch, and spottail shiner. All ANOVA designs were Model I, full factorial, balanced designs calculated with the statistical package BMD8V (Statistical Research Laboratory 1975). To approach the assumptions of the model more closely, larval fish densities were transformed using log (density + 1). Data from two zones, beach and open water, were analyzed separately. Factors used in ANOVA applied to larval fish density data in the beach zone included Year (1973 through 1979), Month (June through August), Station (A, north Cook; B, south Cook; and F, Warren Dunes), and Diel Period (day and night) for alewife and spottail shiner. Factors used in the open water zone included Year, Month, Area (Cook and Warren Dunes), Depth (6- and 9-m contour), and Diel Period for alewife, and Year, Area, Depth, and Diel Period for yellow perch. Only density data from the month of June were used in yellow perch ANOVA.

Because preliminary tests showed no significant trend in larval fish densities among depth strata (surface to near bottom) for a given sampling site and time, samples from different depth strata from the same site and time (day or night) were used as replicates in the ANOVAs of open water stations. Because larval fish samples were taken at 2-m intervals in open water, stations at 6 m, (C, south Cook, and G, Warren Dunes) had one less replicate than 9-m stations (D, south Cook, and H, Warren Dunes). To balance the design, the mean of densities from the four strata at 6-m stations replaced the missing 8-m value. The unweighted means method for balancing designs (Fox 1973) was then applied to the open water results. Treatment sums of squares were multiplied by the ratio of harmonic mean cell size to maximum cell size to adjust for substitutions, and the number of missing values was subtracted from degrees of freedom of the error term to adjust mean square error.

The unweighted means method of adjustment was used for samples that were lost because of inadequate preservation or not collected due to inclement weather. The mean of densities of the remaining replicates at a station was substituted for the missing value; densities from comparable stations and depth strata were used when multiple samples from a station were missing. The following missing samples required substituted values in the ANOVA:

- 1) June 1973, 1 m, day, station C.
- 2) August 1974, 0.5 m day, station H; 2 m, night, station G; 8 m, night, station H.
- 3) June 1976, 0.5 m, 2 m, 4 m, 6 m, night, station C; 8 m, night, station D.

Changes in abundance of larvae as they grew were estimated by the method of Cada and Hergenrader (1980). Density of larvae caught in each 0.5-mm interval of total length was plotted against densities summed across monthly sampling periods and years. Curves were smoothed by grouping data into 2-mm intervals.

Field-Entrainment Comparison

We compared densities of fish eggs in field and entrainment samples using the following method. First, we computed density for each diel period (two) of field sampling as the mean of densities at stations C, D, and R, where density at each station was the mean of replicates (four at 6-m stations C and R, five at

9-m station D). The density computed for each diel division of entrainment sampling was the mean of four replicates. Density reported for each diel period (day or night) was the mean of two sets of samples (eight total), namely dusk-midnight and midnight-dawn for nighttime density and dawn-noon and noon-dusk for daytime density. Thus each diel comparison each month was based on 13 field and 8 entrainment samples.

To compare annual trends in egg abundance in field and entrainment samples, we recorded total density each year. Total density was the sum of densities in the monthly sampling periods, May through August. We summed day and night sample densities to obtain totals for each month. We used Spearman rank correlation tests to compare abundance ranks of eggs in field and entrainment samples. Rank correlation coefficients were computed by ranking mean densities each year.

ENTRAINMENT

Sampling

Species and numbers of larvae and eggs entrained at the Cook Plant have been monitored by standardized sampling since 1973. However, sampling in 1973 and 1974 was limited because of the sporadic testing of condenser cooling systems. These data are presented in detail in Jude et al. (1979b). This report analyzes data collected during operational years 1975 to 1979. In 1975, supplemental sampling was undertaken to examine vertical and horizontal stratification of eggs and larvae in the intake forebay.

An entrainment sampling unit included a Hale (type 30LC-1750) diaphragm pump (maximum capacity, 300 liters per minute; mean capacity, 208 liters per minute) with a 7.6-cm diameter hose extending into the intake forebay to a depth of 5 m (Fig. 4). The 5-m depth (maximum depth in the forebay is 9 m) was chosen because of results of our vertical and horizontal stratification testing in 1975 (Jude 1976). Water was pumped through a 0.5-m diameter, no. 2 Nitex nylon, $363-\mu$ m mesh plankton net suspended in a 208-1 drum. A flowmeter installed in the drum's effluent pipe measured the volume of water filtered. Standard entrainment sampling units were located at grates 2, 3 north, 3 south, and one at the Unit 1 discharge (Fig. 4). Seven grates span the length of the screenhouse forebay floor. Most sampling in 1975-1979 was done at grates 2 and 3. Unit 1 circulation pumps draw most of their water under grates 1, 2, and 3 (Fig. 3).

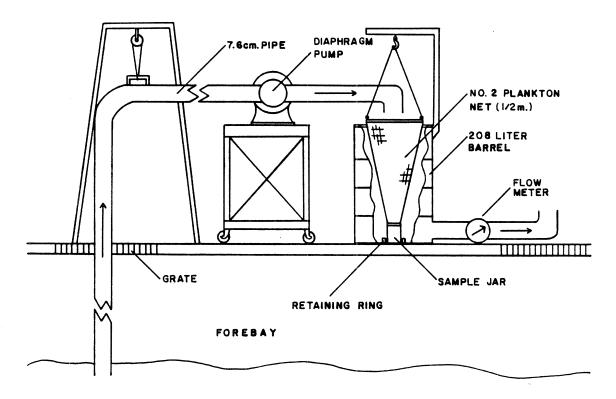


Figure 4. Schematic diagram of an entrainment sampling unit, showing the forebay, sampling pipes, diaphragm pump, plankton net, and flowmeter in the discharge pipe.

Standard series entrainment samples were collected twice per month, except for June, July, and August when sampling was done once per week to coincide with peak abundance of larvae. Samples were collected over a 24-h period. Each 24-h period was divided into four diel sampling divisions which varied from 4 to 8 h, depending on division and day length. The four divisions were sunrise-noon, noon-sunset, sunset-midnight, and midnight-sunrise. Sixteen samples, four replicates (three intake, one discharge) per division, were collected for each 24-h period.

Supplemental sampling was conducted in 1975 to measure differences in the horizontal and vertical distribution of eggs and larvae in the forebay and to help establish validity of sampling location and depth. This study is described in detail by Jude (1976), but will be briefly discussed here. For the depth study, an analysis of variance (ANOVA) design with three depths (2, 5, and 8 m) and six time periods (2300-0300, 0300-0700, 0700-1100, 1100-1500, 1500-1900, 1900-2300) with days (29-31 July 1975) as a random factor was used. Similarly, for the grate study there were three grates (grate 2, 5, and 7) and six time periods with days as a random factor (31 July-2 August

1975). See Figure 3 for details of the locations of these sampling areas. The depth study was conducted at grate 3 and the grate study was conducted at 5 m. All samples from the depthgrate study were 4-h duration (about 38 m³ of water was pumped per sample).

The original entrainment data from the 1975 depth-grate study were reexamined and updated with new taxonomic information. Some changes were made, but in general they had minor impact on our original analyses. Changes included reassignment of some species identifications, and all samples were rechecked for missed larvae and eggs. Additionally, data collected during standard series entrainment sampling from 1975 to 1979 were examined for indications of differences in the distribution of larvae and eggs in forebay waters, pump avoidance by larvae, destruction of larvae during condenser passage, and sampling adequacy.

Densities of larvae and eggs represent a conversion of number per volume sampled (the amount of water pumped through the plankton net) to number per standardized volume (1,000 m³). These standardized mean densities of larvae and eggs were expanded to the volume of water circulated by the plant during the time represented by that diel period. The total number of fish and eggs entrained over 24 h was computed by totaling estimates from each of the four diel sample divisions during a sample period. Each of these four estimates was derived by multiplying the mean density (n = four) times the total volume of water pumped through the plant during the time represented by that particular division. For yearly estimates, non-overlapping, contiguous time intervals (usually 1-2 wk) were established such that the sampling date was the approximate midpoint of the interval. Estimated entrainment during a sampling period was assumed to be representative of fish larvae and egg abundance per unit volume of circulating water during the 1-2-wk sample interval. The estimated number of fish larvae and eggs entrained was expanded accordingly. These data were totaled for each month and then yearly estimates computed.

Sample Types

The Cook Plant entrainment sampling regime has been modified several times during the course of this study. Four classes of samples describe the use or type of sample collected: standard, supplemental, processed but not used, and not processed (discarded or lost). For a summary of entrainment sampling locations and effort from 1975 to 1979 see Results and Discussion, Entrainment - Sampling Adequacy.

Standard series samples were those that could be compared with others in terms of location, duration, and frequency of sampling. Standard samples were collected from grates 2 and 3, and from either the Unit 1 or Unit 2 discharge during any of four diel periods (midnight to sunrise, sunrise to noon, noon to sunset, or sunset to midnight); depth was 5 m. Volume of water filtered for each sample must have been consistent with volumes of other standard samples collected during the same diel period. A complete standard series sampling set resulted in the collection of 16 samples, 4 samples (3 intake, 1 discharge) from each of the four diel periods. At least one, but usually two standard series sampling sets were collected every month from July 1976 to December 1979, except during January and February 1977 when the plant was not operating. Additional standard series samples were collected weekly during June, July, and August of most years. Prior to July 1976, sampling at grate 3 and the Unit 1 discharge represented standard samples.

Supplemental samples were those taken to examine the vertical and horizontal stratification of fish larvae and eggs in the forebay; samples extending across diel periods (i.e., samples taken all night, all day, noon to midnight, midnight to noon, or for 24 h); samples for which inadequate data concerning location of sampling were recorded; and samples taken from grates other than 2, 3, or Unit 1 discharge. Data from supplemental samples were used to support conclusions concerning heterogeneity in the distribution of larvae and eggs in the forebay and to increase the entrainment data base for improving estimates of entrainment losses.

Laboratory samples which were not comparable to other samples collected during the same time period were removed from the analyses. These samples included: (1) samples in which volumes of water filtered were substantially reduced (less than 75 liters per minute), (2) reduced sampling duration (usually as a result of pump or power failure), or (3) any other problem samples. Samples which were lost, broken, or inadequately preserved comprised this final category. These samples were noted but not included in the entrainment data base.

LABORATORY PROCEDURES

All entrainment and field samples of fish larvae and eggs were preserved with a 10% formaldehyde solution immediately after collection and then transported to the Great Lakes Research Division's Fishery Laboratory for analysis. For our purposes, fish larvae were defined as any fish 25.4 mm or less in total length (TL). In the laboratory, larvae were sorted, identified,

counted, and measured. Larvae were identified to species, when possible, otherwise to the lowest taxonomic group (see Table 1). Alewife, spottail shiner, and rainbow smelt were measured to the nearest 0.5 mm TL, while all others were measured to the nearest 0.1 mm TL. Eggs were also counted but not identified to species. When large quantities were found, egg numbers were estimated via a volumetric subsampling method (see Jude et al. 1975). All larvae and a subsample of eggs from each entrainment sample were then catalogued and saved for future reference. Data were recorded directly on standard coding forms, keypunched, and transferred to computer tapes for analysis.

Table 1. Ichthyoplankton species and groups entrained or collected in the vicinity of the Cook Plant from 1973 to 1979. Scientific names from Robbins et al. (1980).

| Common name or category | Code | Scientific name or category |
|---|---|---|
| Alewife Spottail shiner Rainbow smelt Yellow perch Trout-perch Johnny darter Slimy sculpin Common carp Ninespine stickleback Mottled sculpin Deepwater sculpin Burbot Quillback | AL SP SM YP JD SCP NS FR BL | Alosa pseudoharengus (Wilson) Notropis hudsonius (Clinton) Osmerus mordax (Mitchill) Perca flavescens (Mitchill) Percopsis omiscomaycus (Walbaum) Etheostoma nigrum Rafinesque Cottus cognatus Richardson Cyprinus carpio Linnaeus Pungitius pungitius (Linnaeus) Cottus bairdi Girard Myoxocephalus thompsoni (Girard) Lota lota (Linnaeus) Carpiodes cyprinus (Lesueur) |
| Unidentified sculpins Unidentified minnows Unidentified coregonids Unidentified darters Unidentified suckers Unidentified clupeids | UC XM XC XE XS XH | Cottus spp. Cyprinidae Coregonus spp. Etheostoma spp. Catostomidae Clupeidae |
| Unidentified fish larvae as a result of poor condition Unidentified fish larvae Fish eggs | XP XX | |

Larval fish identification was based on knowledge of species abundance and spawning times in southeastern Lake Michigan, comparison of specimens with those in the Great Lakes Regional Fish Larvae Collection (Dorr and Jude 1981), and reference to taxonomic works (Lippson and Moran 1974, Nelson and Cole 1975, Dorr et al. 1976, Hogue et al. 1976, Jude et al. 1979b, and Auer 1982). Some fish larvae identifications may be reevaluated and reassignments made, but these taxonomic changes will not affect total entrainment estimates in any year.

RESULTS AND DISCUSSION

FIELD DISTRIBUTION OF FISH EGGS AND LARVAE

General Trends

Fifteen taxa of fish larvae were identified from our field samples during the 7-yr study. Alewife (Alosa pseudoharengus) dominated collections in every year. Spottail shiner (Notropis hudsonius), yellow perch (Perca flavescens), and rainbow smelt (Osmerus mordax) were also present in all years, but in much smaller numbers than alewife. Burbot (Lota lota), trout-perch (Percopsis omiscomaycus), common carp (Cyprinus carpio), and johnny darter (Etheostoma nigrum) appeared in field samples occasionally. The remaining seven taxa, deepwater sculpin (Myoxocephalus thompsoni), slimy sculpin (Cottus cognatus), ninespine stickleback (Pungitius pungitius), unidentified minnows (Cyprinidae), unidentified suckers (Catostomidae), unidentified herring (Clupeidae), and unidentified sculpins (Cottus spp.) were extremely rare; each was present in only 1 or 2 yr.

Larvae first appeared in samples in April (1973, 1975, 1976, 1978) or May (1974, 1977, 1979), and became most abundant during the summer months (June-August), when spawning was greatest. The last larvae of the season were collected in September (1973, 1976), October (1974, 1975, 1979), or November (1977, 1978). Smelt, burbot, yellow perch, deepwater sculpin, and alewife were among the earliest larvae to appear during our field season; alewife, and occasionally trout-perch, were the latest.

June, July, and August samples contributed between 80 and 99% of the total number of larvae collected in each year. July was usually the month of highest mean densities of larval fish at both beach and open water stations, followed by June, and then August. During the summer, monthly mean densities were consistently higher at beach stations than at open water stations (except for June 1974 and June 1977).

Alewife

General abundance trends--

In the beach zone, alewife was most abundant in 1973 and least common in 1979. Geometric mean densities (no. per 1,000 m³) from 1973 through 1979, averaged over June-August, were 3,340, 180, 500, 330, 190, 270, and 40, respectively. In the

open water zone, the year of peak abundance was 1974, and the year of lowest abundance was 1978. Geometric mean densities in open water from 1973 to 1979 were 120, 520, 210, 30, 30, 5, and 40, respectively. Mean densities differed significantly among years at both beach and open water stations (ANOVA; P < 0.0001 at both sets of stations). Mean abundance did not differ significantly between Warren Dunes and Cook Plant (ANOVA; beach: P = 0.19; open water: P = 0.15), implying no detectable plant effect.

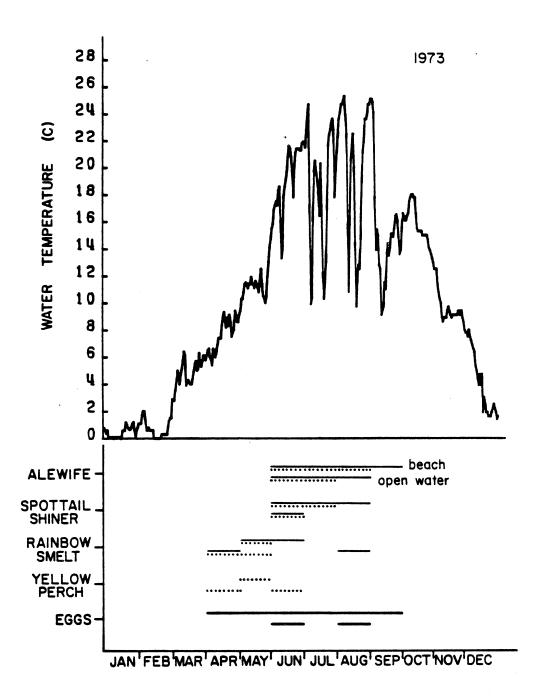
Seasonal occurrence --

Occurrence of alewife larvae in the study area was distinctly seasonal, corresponding with the period of higher water temperatures, chiefly June through August or September (Figs. 5-11). Field samples in these 4 mo produced 95-100% of the larvae collected each year. Over the years, first appearance of alewife larvae in field samples was usually in June, although in 1979, a year of relatively colder water temperatures (Table 2, Fig. 11), it did not occur until July. Peak abundance of alewife larvae at beach stations was in June (1974, 1975, 1976) or July (other years). At open water stations, July usually produced the highest mean densities of larvae, although August was the peak month in 1977 and 1978. The month of highest density often differed between beach and open water stations. Peak densities at open water stations were often later (1975, 1976, 1977) and rarely earlier (1973) than peak densities in the beach zone. Last collection of larvae in field samples was normally in September or October, with an extreme of November in 1977 (Figs. 5-11).

Occurrence of maximum larval alewife abundance was a month earlier in 1973-1976 than in 1977-1979, with maximum densities in June in earlier years and July in later years. The difference in timing of peak abundance presumably occurred because early June temperatures were high enough to induce spawning before our June sampling period in 1973-1976 but were too low in 1977-1979 (Table 2).

Vertical distribution--

The pattern of distribution of alewife larvae across depth strata was examined in detail for 6-m stations C (Cook) and G (Warren Dunes) and 9-m stations D (Cook) and H (Warren Dunes) for 1974-1979 but not for 1973, when tow depths differed, nor for beach stations A, B (Cook), and F (Warren Dunes), where collections were taken at only one depth. At both 6-m and 9-m stations, two conspicuous features of vertical distribution were



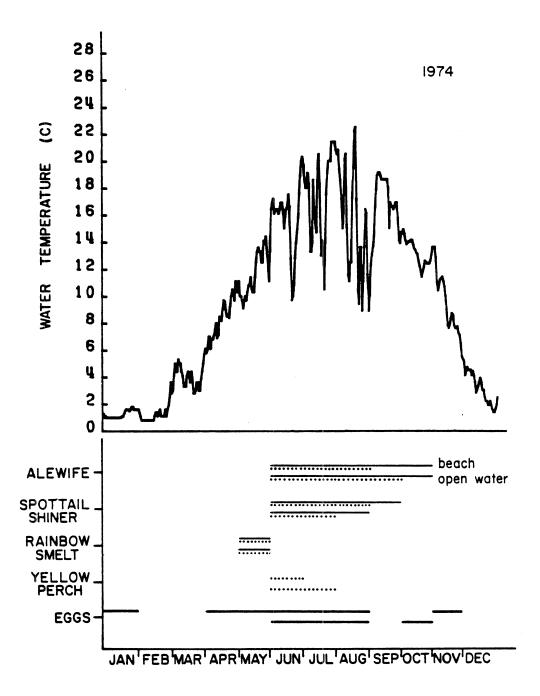


Figure 6. Seasonal occurrence of unidentified fish eggs (---), and yolk-sac larvae (----) and post-yolk-sac larvae (-----) of alewife, spottail shiner, rainbow smelt, and yellow perch in field samples during 1974. Beach samples were taken once per month in January and March-November. Open water samples were taken once per month in April-November. Temperature profile represents daily water temperatures (6-m depth) recorded at St. Joseph, Michigan, approximately 16 km north of the plant.

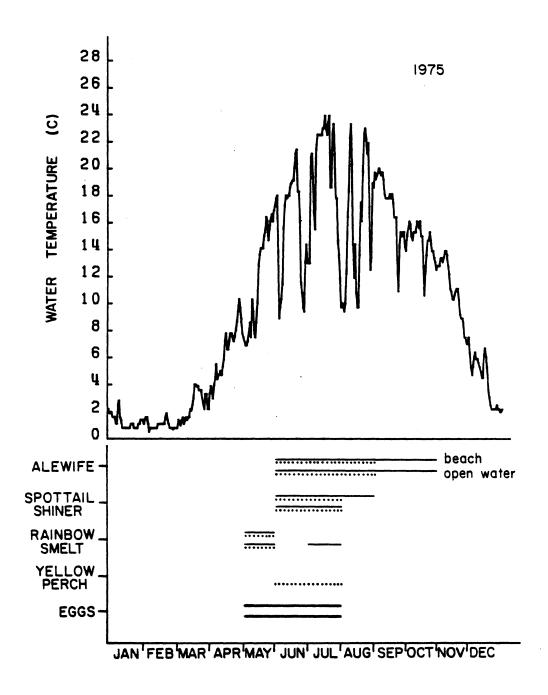


Figure 7. Seasonal occurrence of unidentified fish eggs (_____) and yolk-sac larvae (_____) of alewife, spottail shiner, rainbow smelt, and yellow perch in field samples during 1975. Both beach and open water samples were taken once per month in April-November. Temperature profile represents daily water temperatures (6-m depth) recorded at St. Joseph, Michigan, approximately 16 km north of the plant.

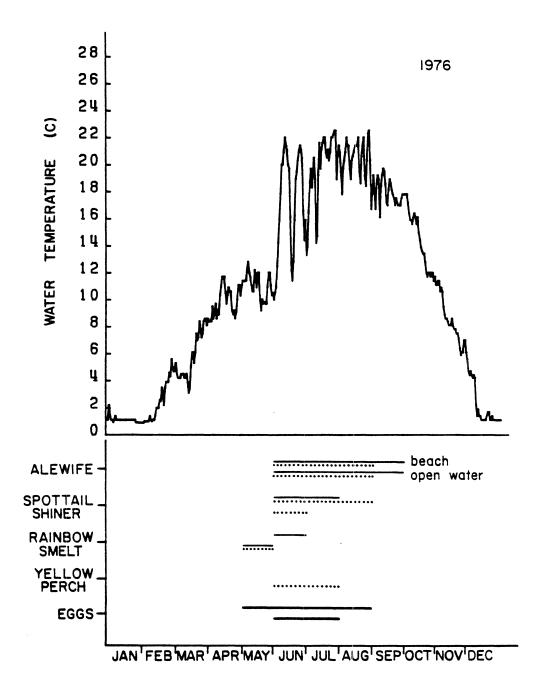


Figure 8. Seasonal occurrence of unidentified fish eggs (______), and yolk-sac larvae (______) and post-yolk-sac larvae (______) of alewife, spottail shiner, rainbow smelt, and yellow perch in field samples during 1976. Beach samples were taken once per month in February and April-November. Open water samples were taken once per month in April-October. Temperature profile represents daily water temperatures (6-m depth) recorded at St. Joseph, Michigan, approximately 16 km north of the plant.

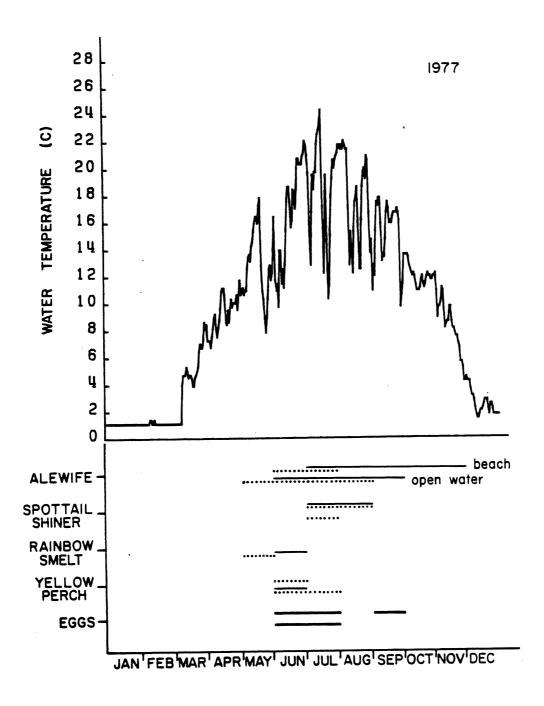
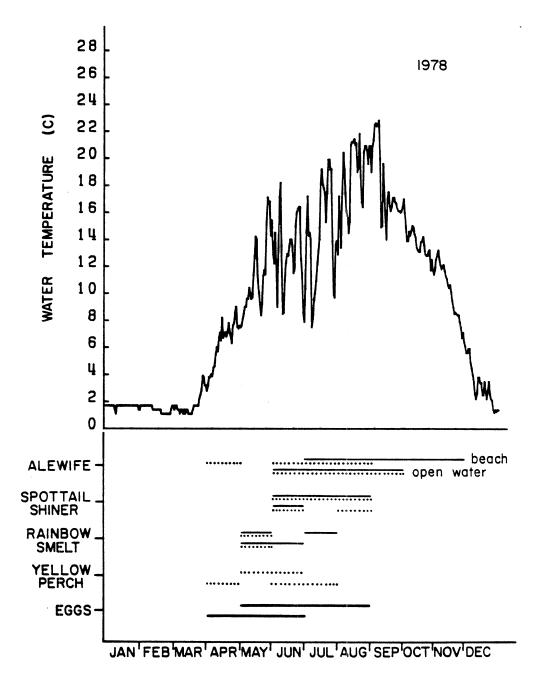


Figure 9. Seasonal occurrence of unidentified fish eggs (______) and yolk-sac larvae (______) of alewife, spottail shiner, rainbow smelt, and yellow perch in field samples during 1977. Beach samples were taken once per month in April-November, open water samples once per month in April-September. Temperature profile represents daily water temperatures (6-m depth) recorded at St. Joseph, Michigan, approximately 16 km north of the plant.



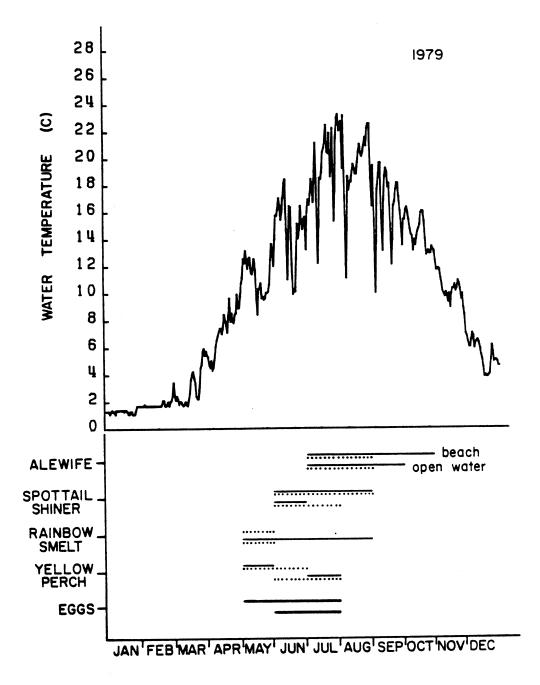


Figure 11. Seasonal occurrence of unidentified fish eggs (_____), and yolk-sac larvae (_____) and post-yolk-sac larvae (_____) of alewife, spottail shiner, rainbow smelt, and yellow perch in field samples during 1979. Beach samples were taken once per month in April-November, open water samples once per month in April-September. Temperature profile represents daily water temperatures (6-m depth) recorded at St. Joseph, Michigan, approximately 16 km north of the plant.

Table 2. Water temperatures (°C) at larval fish sampling stations (N = 6 for beach, and 36 for open water samples) in each monthly sampling period from May to August, 1973-1979, near the D. C. Cook Plant, southeastern Lake Michigan.

| Year | Month | Beach Stations (A, B, F) | | Open Water (C, D, | |
|------|--------|--------------------------|---------|-------------------|---------|
| 1691 | MOITEI | Minimum | Maximum | Minimum | Maximum |
| 1973 | May | 10.7 | 12.5 | 9.3 | 11.9 |
| | Jun | 22.0 | 24.5 | 16.3 | 22.0 |
| | Jul | 21.5 | 25.3 | 15.5 | 22.4 |
| | Aug | 23.8 | 26.8 | 8.5 | 17.0 |
| 1974 | May | 11.1 | 12.7 | 8.4 | 10.5 |
| | Jun | 16.5 | 18.2 | 14.2 | 17.6 |
| | Jul | 20.4 | 24.0 | 10.2 | 25.0 |
| | Aug | 16.8 | 24.0 | 16.4 | 24.0 |
| 1975 | May | 9.5 | 12.9 | 7.8 | 10.0 |
| | Jun | 13.8 | 16.5 | 7.9 | 17.0 |
| | Jul | 24.4 | 27.7 | 21.6 | 23.9 |
| | Aug | 22.9 | 24.0 | 17.7 | 24.4 |
| 1976 | May | 15.0 | 17.5 | 10.5 | 13.1 |
| | Jun | 21.3 | 24.5 | 19.2 | 20.5 |
| | Jul | 18.0 | 22.0 | 17.3 | 25.1 |
| | Aug | 22.0 | 24.5 | 20.6 | 22.5 |
| 1977 | May | 16.8 | 18.1 | 16.0 | 20.0 |
| | Jun | 14.2 | 15.4 | 14.5 | 18.5 |
| | Jul | 20.0 | 23.1 | 19.6 | 22.3 |
| | Aug | 22.5 | 24.3 | 19.4 | 23.5 |
| 1978 | May | 10.0 | 11.9 | 7.5 | 10.5 |
| | Jun | 9.5 | 16.0 | 5.3 | 13.0 |
| | Jul | 9.0 | 15.0 | 6.0 | 11.0 |
| | Aug | 21.0 | 25.2 | 21.8 | 22.0 |
| 1979 | May | 12.5 | 15.0 | 12.2 | 9.5 |
| | Jun | 16.5 | 18.5 | 12.0 | 17.0 |
| | Jul | 21.4 | 25.5 | 17.0 | 22.7 |
| | Aug | 23.0 | 26.0 | 19.0 | 24.2 |

evident. First, abundance was least in the lowest depth stratum, and second, distribution changed from day to night (Tables 3 and 4).

Table 3. Vertical distribution of alewife larvae at 6-m stations C (Cook) and G (Warren Dunes), June through August, 1974-1979. Abundance data are total densities (number per 1,000 m 3) summed across all samples and all months each year for each depth stratum. N = 288 samples.

| Depth Stratum | Sum of Densities (thousands) | | % of Total | | |
|------------------|------------------------------|-----|------------|-----|--|
| (m) | Night | Day | Night | Day | |
| 0 | 43 | 18 | 26 | 21 | |
| 2 | 46 | 31 | 27 | 36 | |
| 4 | 45 | 24 | 27 | 28 | |
| 6 | 34 | 14 | 20 | 16 | |
| Totals | 168 | 87 | 100 | 100 | |

During the day, peak densities occurred in the 2-m stratum, and abundance declined with increasing depth. Larvae were relatively scarce in surface samples. At night, larvae concentrated in the 0-, 2-, and 4-m strata. Thus, larvae in day and night samples showed similar depth distributions except that some appeared to migrate to the surface at night.

Diel distribution--

In general, more alewife larvae were caught at night than during the day at both beach and open water stations. Geometric mean densities (number per 1,000 m³) of larvae at beach stations A, B, and F for the period 1973-1979 were 230 during the day and 390 at night. For open water 6- and 9-m stations C, D, G, and H, the comparable densities were 50 and 110. The day-night differences were statistically significant (ANOVA; beach, p < 0.001; open water, P = 0.01) at both groups of stations. Thus, daytime densities exceeded nighttime densities at beach stations in 1973 and 1977, and at open water stations in 1977.

Table 4. Vertical distribution of alewife larvae at 9-m open water stations D (Cook) and H (Warren Dunes), June through August, 1974-1979. Abundance data are total densities (number per 1,000 m 3) summed across all samples and all months each year for each depth stratum. N = 360 samples.

| Depth Stratum | Sum of De (thous | | % of Total | | |
|------------------|---------------------|-----|------------|-----|--|
| (m) | Night | Day | Night | Day | |
| 0 | 30 | 7 | 22 | 11 | |
| 2 | 34 | 19 | 25 | 30 | |
| 4 | 27 | 17 | 20 | 27 | |
| 6 | 22 | 10 | 16 | 16 | |
| 8 | 21 | 10 | 16 | 16 | |
| Totals | 134 | 63 | 100 | 100 | |

Densities were greater at night than during the day throughout the season at open water stations. This daily change in abundance occurred consistently from month to month and year to year. Only in June and July 1977 and August 1978 did daytime catches exceed night catches. In the latter two cases, the reversal probably occurred because night samples were taken more than 2 wk later than day samples on dates outside the period of peak alewife abundance. The most important source of the diel shift in abundance was that larvae probably avoided nets more effectively in daylight. Net avoidance increases as larvae grow and develop their swimming ability and vision (Houde 1969, Theilacker and Dorsey 1980). Thus, evidence for net avoidance was that samples usually contained more large larvae at night than in daytime (Fig. 12). The proportion of larvae captured at night (number captured at night divided by the sum of the number captured at night and the number captured in daytime) increased with body size. At open water stations proportion of larvae captured at night rose from 60 to 73% for larvae < 13 mm and to 95% for larvae > 17 mm (Table 5). This result indicates that nighttime catches estimated larval abundance more reliably than daytime catches, especially for larger larvae.

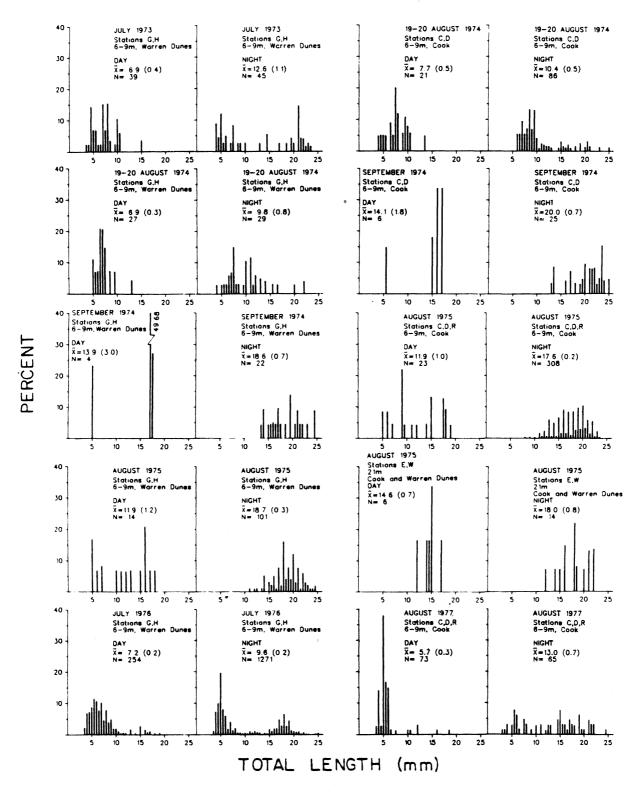


Figure 12. Diel differences in length-frequency distributions of alewife larvae in open water samples at the D. C. Cook Plant, 1973-1979. N = number of larvae, \bar{X} = mean length, standard error is given in parentheses.

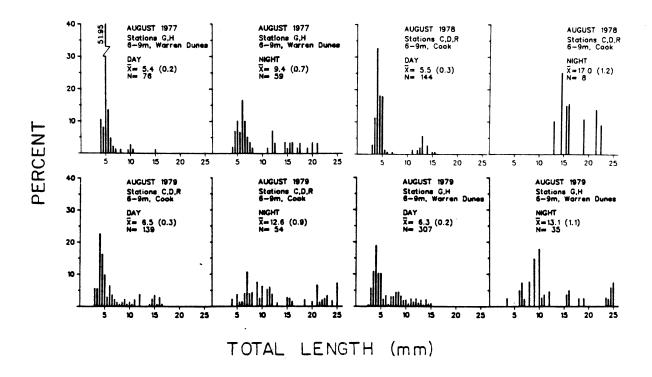


Figure 12. Continued.

The diel pattern at beach stations was less consistent. Alewife larvae were significantly more common at night in June and July but more common during the day in August (ANOVA, P < 0.001). Only in 1979 were larvae more abundant at night in June, July, and August. We attributed the seasonal diel shift to a daily migration between the beach and open water zones by larger larvae, because more larger larvae were collected in the beach zone during the day (the time of greater net avoidance) than at night. The proportion of larvae > 7.1 mm collected during the day in the beach zone usually comprised over 80% of the day-night catch (Table 5), while more smaller larvae (< 7 mm) were collected at night (58-65% of the total catch). By August, large larvae usually dominated collections, hence the greater abundance of larvae in daytime in August.

Whenever larvae > 7 mm were present at beach stations, they were more abundant in daytime than in nighttime samples (Fig. 13). However, the largest larvae (> 20 mm) were often more abundant at night (Fig. 13, last six graphs), perhaps because they were virtually uncatchable in daylight.

Table 5. Night-to-day catch ratios (% caught at night) for different sizes of larval alewives in field samples, 1974-1978. Percentages are based on total density, which is number per 1,000 m³, summed across all samples and all years at 6- and 9-m open water stations C, D, G, and H and beach stations A, B, and F.

| Length Interval | Habitat | | | |
|--------------------|------------|---------|--|--|
| (mm) | Open water | . Beach | | |
| 3.1- 5.0 | 73 | 58 | | |
| 5.1- 7.0 | 60 | 65 | | |
| 7.1- 9.0 | 65 | 19 | | |
| 9.1-11.0 | 71 | 15 | | |
| 11.1-13.0 | 73 | 11 | | |
| 13.1-15.0 | 79 | 12 | | |
| 15.1-17.0 | 90 · | 35 | | |
| 17.1-19.0 | 96 | 28 | | |
| 19.1-21.0 | 100 | 22 | | |
| 21.1-23.0 | 98 | 15 | | |
| 23.1-25.0 | 98 | 30 | | |

A direct demonstration of the hypothesis of horizontal migration would require detection of an influx of large larvae to the open water zone at night, but such an effect would be masked by the observed nocturnal increase in the catch of large larvae stemming from their increased vulnerability to nets at night. The data provide indirect evidence of horizontal migration in August; namely, nighttime beach densities dropped relative to open water densities in August. Mean densities at beach stations exceeded those at open water stations in 62% of the daytime sampling periods in June and July and in 57% of the periods in August. There was little difference between daytime beach densities and open water densities in August when compared with

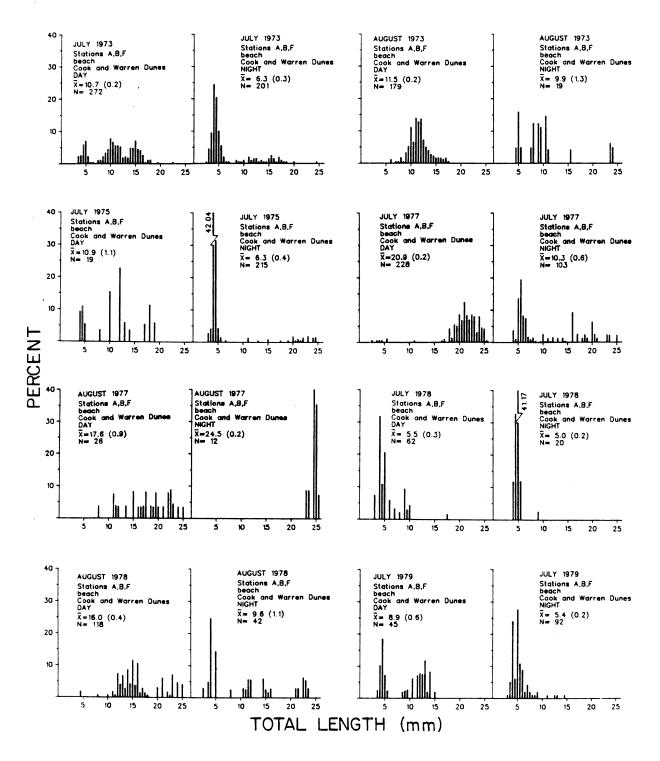


Figure 13. Diel differences in length-frequency distributions of alewife larvae in beach zone samples at the D. C. Cook Plant, 1973-1979. N = number of larvae, \bar{X} = mean length, standard error is given in parentheses.

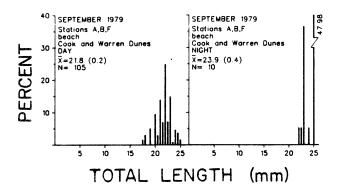


Figure 13. Continued.

June and July. In contrast, beach densities exceeded open water densities in 77% of the nighttime sampling periods in June and July but in only 43% of them in August.

Depth distribution--

In general, larval alewife abundance at sampling stations declined with increasing bottom depth. Geometric mean densities (number per 1,000 m³), averaged for the period 1973-1979, were 296 at beach stations, 104 at 6-m stations, and 52 at 9-m stations, and these mean densities differed significantly (ANOVA, P < 0.01). Abundance was even lower at 21-m stations. From June through August, 1975-1979, the number of nighttime samples containing alewife larvae at 9-m stations D and H was 95 versus 54 at 21-m stations E and W.

On a yearly basis, fish larvae abundance correlated more consistently with bottom depth than with any other parameter. Mean densities at beach stations exceeded those at 6-m stations in all years except 1974, the year of maximum abundance at open water stations, and 1979, when the open water value was only 10% higher. Densities at beach and 6-m stations exceeded those at 9m stations in all years and in all months. Alewife larvae were scarce at 21-m stations compared to high abundances inshore chiefly because newly hatched fish (< 5 mm) were much scarcer at 21 m than at 6 or 9 m (Fig. 14). The relative lack of hatchlings at 21 m presumably occurred because spawning and hatching were concentrated inshore. On the single occasion that larvae were more abundant at 21 m (night samples, August 1977), length distributions differed greatly among station groups (Fig. 14, last three graphs). The difference in lengths implies that samples were from different populations and thus from separate

water masses. In fact, subsurface temperatures at 21-m stations E and W rose from 8°C on 9 August (during daytime sampling) to 22°C on 10 August (during night sampling); that is, a warm water mass replaced a cold one, presumably bringing with it a different larval fish population.

Water temperature was an important correlate of larval fish abundance in the study area, month by month (Table 2, Figs. 5-11). Larval alewife densities at beach stations were as great as or greater than at open water stations in June of every year, and temperatures were higher at the beach than in open water during the June field trip in every year except 1977 (Table 2). July water temperatures were highest in the beach zone in 5 yr; temperatures were higher in the open water zone in 1974 and 1976. The warmer zone in July had the greater mean larval fish density in all years except 1975. August water temperatures were similar at all depth contours in all years except 1973, and no depthrelated trends in abundance from year to year could be discerned from August data; in 4 yr the beach zone and in 3 yr the open water zone contained higher densities of larvae.

Growth and survival --

Seasonal changes in length-frequency distribution of larval alewives helped show pulses of spawning and tracked the growth of cohorts. Length-frequency histograms in all years showed three consistent seasonal changes for alewives (Fig. 15). First, mean size of larvae increased through the season because larvae grew. Second, the abundance peak at the lower end of the distribution became less pronounced by August, as spawning declined and newly hatched larvae became scarce. Third, the greatest range of sizes occurred in midsummer, when both newly hatched and older larvae were present.

Length histograms for open-water stations were like those shown for beach stations but with fewer large larvae (see Alewife--diel distribution). Consequently, data on size distributions in the open water zone in late summer and fall were sketchy.

Deviations from the normal seasonal progression of spawning and growth occurred in 1978 and 1979 (Fig. 16), when intermittent low temperatures (upwellings) occurred in the open-water zone during the spawning season. In 1978 the usual large July hatch failed to occur and spawning was delayed into August. Temperatures in early July were 10-14°C (Table 6), the coldest recorded for that month during 1973-1979. In 1979 no substantial alewife hatching had occurred by the 11-13 June sampling period, either at the beach or offshore. Alewife larvae were first collected in July, and hatchlings were still abundant in August.

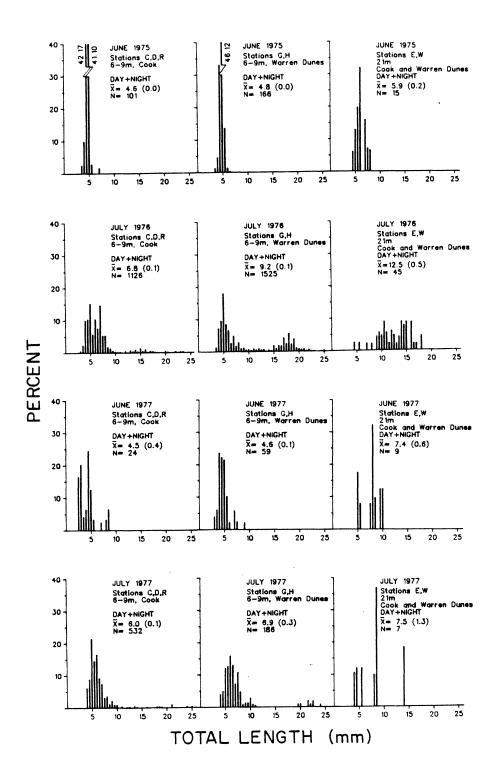


Figure 14. Length-frequency distributions of alewife larvae at 6-, 9-, and 21-m stations at the D. C. Cook Plant, 1975-1979. $N = \text{number of larvae}, \ \bar{X} = \text{mean length}, \ \text{standard error}$ is given in parentheses.

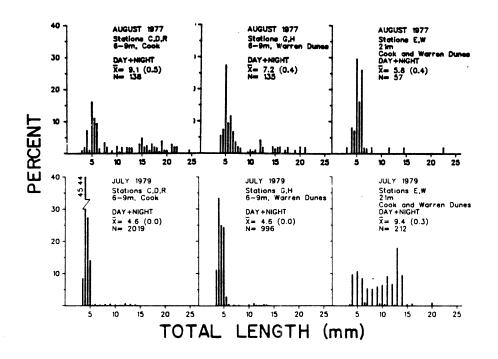


Figure 14. Continued.

Early June temperatures were about 12°C (Table 6), the coldest recorded for that month during 1973-1979. The effects of coldwater upwelling on alewife spawning in eastern Lake Michigan, viz., interruption of spawning and extension of the spawning season, are discussed in detail by Heufelder et al. (1982).

Declining abundance with increasing body length allowed estimates of length-specific survival rates, which measured with size the change in the likelihood that a larva would reach maturity. This is useful because the survival rate of larvae determines the number of fish recruited to adult stocks.

Changes in the abundance of larvae as they grew were estimated by plotting a catch curve, that is, the number of larvae caught in each 0.5-mm interval of total length. To estimate the number of larvae, the method of Cada and Hergenrader (1980) was followed and densities were summed for the years 1974-1979, one sum each for beach and open water data. Only nighttime catches were used because they were less biased by net avoidance and diel migration than daytime catches.

A plot of the logarithm of total density in each length interval produced complex catch curves (Fig. 17). Despite the presence of confounding factors, we can draw several conclusions

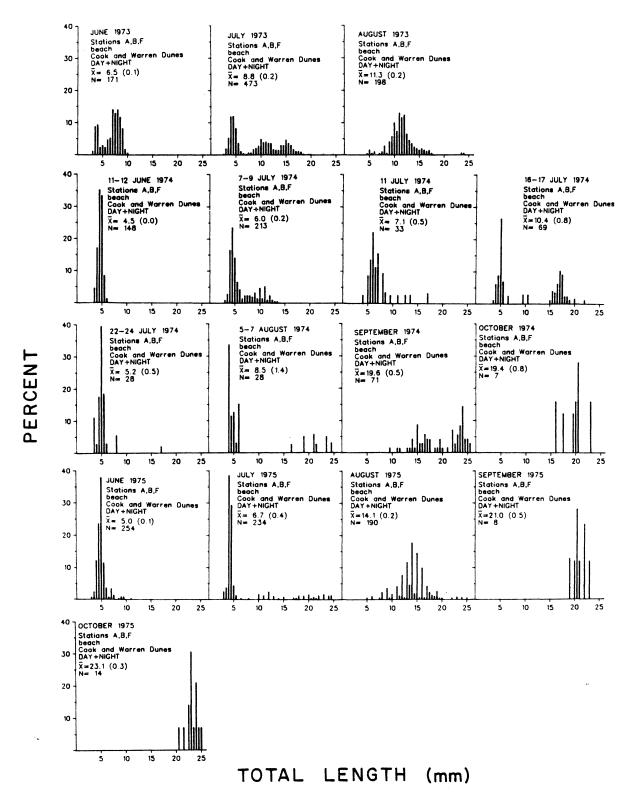


Figure 15. Length frequencies of alewife larvae at beach stations at the D. C. Cook Plant, 1973-1979. N = number of larvae, \bar{X} = mean length, standard error is given in parentheses.

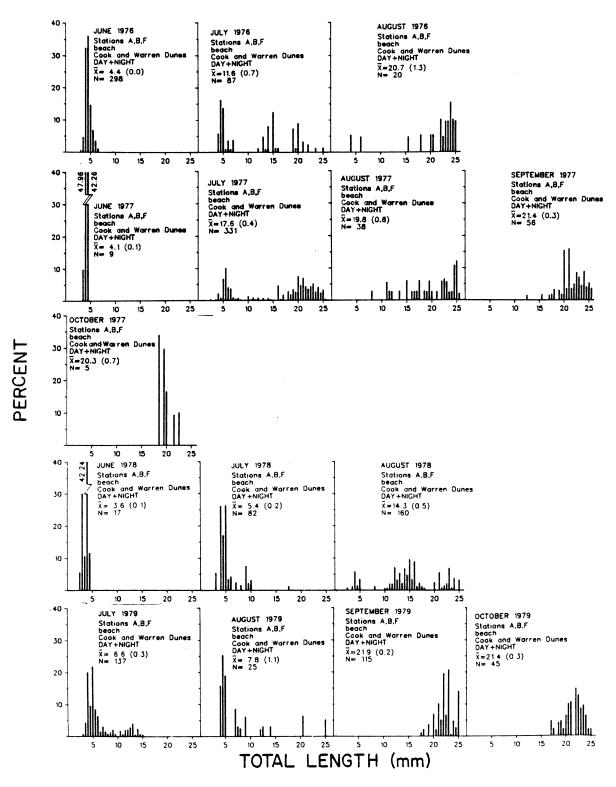


Figure 15. Continued.

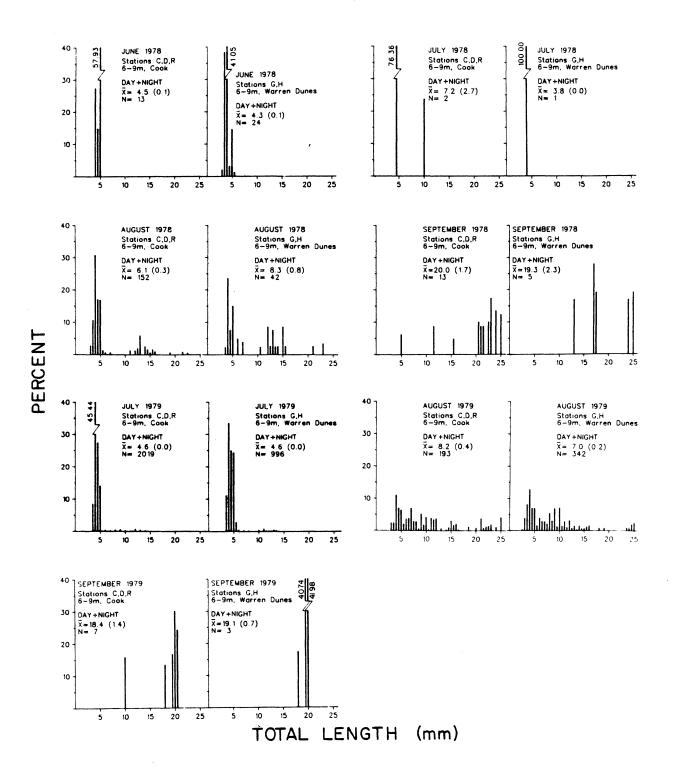


Figure 16. Length frequencies of alewife larvae at open water stations C, D, R (Cook Plant), and G, H (Warren Dunes) in 1978 and 1979. N = number of larvae, \bar{X} = mean length, standard error given in parentheses.

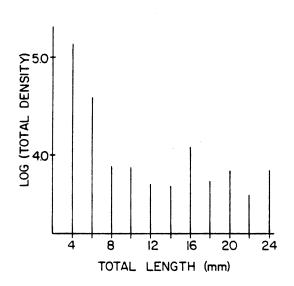
Table 6. Water temperature 1 wk before June and July open water larval fish sampling dates, 1973-1979. Data are from the St. Joseph municipal water intake, 16 km north of the Cook Plant, at the 6-m bottom depth.

| Voor | Wat Temperat | er ure (°C) |
|------|-----------------|----------------|
| Year | Early June | Early July |
| 1973 | 16 | 14-20 |
| 1974 | 14 | 14-16 |
| 1975 | 16 | 14 |
| 1976 | 18 | 16 |
| 1977 | 12-14 | 20-22 |
| 1978 | 8-18 | 10-14 |
| 1979 | 12 | 15 |

from the curves. First, the smallest fish were the most common. The first interval, 3-5 mm, encompasses the prolarval stage, during which larvae gradually absorb their yolk sac. The next interval (5-7 mm) marks the start of the postlarval stage, in which the yolk sac is absent. The catch curves show that about 29% of the prolarvae in the beach zone and 22% of the prolarvae in the open water zone survived to become postlarvae. Rago (1983) reported similar results using 8 yr of entrainment data from the Cook Plant in a model based on an overall first year survival rate of 1%. He estimated 29% (average over 8 yr, SE = 6.6) survival from prolarva to postlarva and 10% (average over 8 yr, SE = 3.1) survival from postlarva to young-of-the-year (YOY). Our field data suggest a 4-5% survival rate from postlarva to YOY (last interval on the catch curves, Fig. 17).

Spottail Shiner

Occurrence of larval spottail shiners in the study area was sharply seasonal, like that of alewife, and corresponded with the period of maximum water temperatures (Figs. 5-11). Spottail shiner larvae first appeared in field samples at both beach and open water stations in June, although not until July in 1977. At



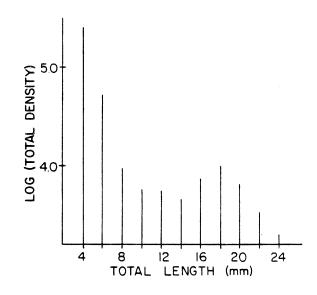


Figure 17. Length-frequency distributions of alewife larvae in nighttime field samples, 1974-1979 combined. Total density is no./1,000 m³, summed across all samples and all years. Total length shown is midpoint of a 2-mm interval. Left panel: beach zone, stations A (north Cook), B (south Cook), and F (Warren Dunes). Right panel: open water zone, stations C (6 m, south Cook), D (9 m, south Cook), G (6 m, Warren Dunes), and H (9 m, Warren Dunes).

beach stations June samples had the greatest number of larvae in 1973, 1975, 1976, and 1978, while July was the peak month in 1974, 1977, and 1979. The last occurrences of larvae at beach stations were in August, with the exception of September 1974. The months of peak density at open water stations were the same each year as those at the beach, except that July was the peak month in 1975.

Densities of spottail shiner larvae in Cook Plant study areas differed significantly among years (ANOVA, P < 0.001). Geometric mean densities (number per 1,000 m³) at beach stations for 1973-1979 were 41, 1,142, 518, 177, 41, 36, and 487, respectively. These results suggest either a highly variable reproductive output in this species or that our once-a-month sampling program sometimes caught and sometimes missed the period of peak abundance. At open water stations, relative abundance was estimated by the number of samples in which spottail shiner larvae occurred. Larvae were found in 20 samples in 1975, 13 in

1979, 12 in 1974, and in 4 or fewer in other years. Hence, yearly abundance trends were parallel at beach and open water stations, except for 1974.

Spottail shiner larvae were much more abundant in the beach zone than offshore. Most samples from open water contained no larvae, and this result precluded comparisons of mean densities at beach and open water stations; however, a steep decrease in abundance with depth was evident. Abundance trends offshore were estimated by comparing the number of samples containing larvae at different depth contours in the period 1973-1979 (1975-1979 at 21-m stations E and W). Stations C and G (6 m) produced 25 such samples; stations D and H (9 m), 15; and stations E and W (21 m), 1. Catch of spottail shiner larvae in bottom sled tows in the beach zone in 1974 suggested that larvae were more common on the bottom than in the water column (Jude et al. 1979a), as occurred at the J. H. Campbell Plant, north of the Cook Plant near Grand Haven (Jude et al. 1980a).

Considerably more spottail shiner larvae were caught at night than during the day at beach stations; most daytime samples produced no larvae at all. The same pattern was evident at open water stations C, D, G, H, and R, where 89% of the 55 samples containing spottail shiner larvae in 1973-1979 were taken at night. The day-night difference was attributed to net avoidance and drift of larvae from the nearshore nursery area to offshore waters. Evidence for net avoidance was similar to that given for alewife. First, night samples often contained large larvae, while day samples rarely did. Second, larvae tows were conducted over a wide vertical and horizontal range, omitting only areas far offshore (beyond the 21-m contour), and we felt that migration to such areas did not occur.

In most years spottail shiners were abundant enough in beach zone samples to show seasonal changes in size distribution, and the changes outlined the schedule of hatching and growth (Fig. 18). Hatchlings (4-5 mm) usually appeared in June and persisted into the first week of August (Figs. 5-11). Spawning began late in 1977, with larvae first collected in July and 4-mm newly hatched larvae still present in August. Water in the beach zone was 14-15°C during the June sampling period, which represents the lower end of the spawning-temperature range reported for spottail shiners (Auer 1982). Net avoidance probably was the reason spottail shiner larvae were absent from our samples in September and October, when no small larvae were present.

Densities of spottail larvae in nighttime beach zone samples did not differ significantly between Warren Dunes and Cook Plant stations in the period 1973-1979 (ANOVA, P=0.79), nor were any differences apparent between preoperational and operational years

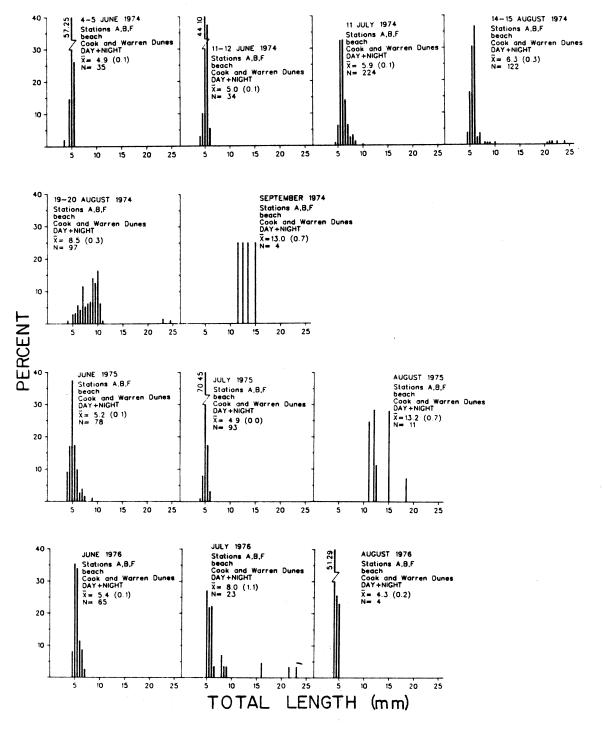


Figure 18. Seasonal growth of spottail shiner larvae at beach zone stations at the D. C. Cook Plant, 1974-1979. N = number of larvae, \bar{X} = mean length, standard error given in parentheses.

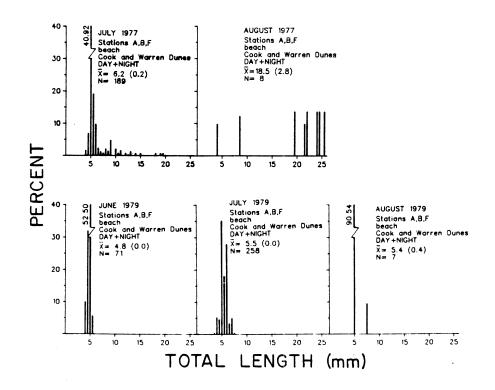


Figure 18. Continued

at Warren Dunes compared with Cook Plant stations. Therefore, we inferred no plant impact on the abundance of spottail shiner larvae.

Yellow Perch

The period of occurrence of larval yellow perch was usually shorter and began earlier than those of alewife and spottail shiner. Yellow perch larvae first appeared in field samples in April in 1973 and 1978 (both years at open water locations), May in 1979, and June in 1974-1977 (Figs. 5-11). Because adult yellow perch in the study area ordinarily did not attain spawning condition until May, the early larvae probably entered Lake Michigan from inland lakes or rivers, where spawning begins sooner than in Lake Michigan (see Perrone et al. 1983). The month of peak abundance of perch larvae was usually June, though scarcity of larvae in 1975 and 1976 makes such a determination uncertain in those years. The latest field samples to contain yellow perch larvae were collected in July, except June in 1973.

Because low numbers of larval yellow perch were caught at most times and stations, the understanding of their distribution in the study area is incomplete. In 1973, 1974, 1977, 1978, and 1979 larval yellow perch were taken in sufficient numbers to permit ANOVA computations, but only in June at open water stations.

Densities of yellow perch larvae in the study area differed significantly among years (ANOVA, P < 0.01). Geometric mean densities (number per 1,000 m³) in June 1973, 1974, 1977, 1978, and 1979 were 3, 17, 16, 4, and 2, respectively. Larvae were too rare in other years for reliable computation of abundance. Larval yellow perch abundance in preoperational and operational years followed no pattern attributable to plant operation. They were scarce at both Warren Dunes and Cook stations in preoperational year 1973 and operational years 1975, 1976, 1978. and 1979. They were most abundant at both sets of stations in preoperational year 1974 and operational year 1977. Abundance did not differ significantly between Warren Dunes and Cook Plant stations (ANOVA, P = 0.50). Thus, no plant impact was inferred on the abundance of yellow perch larvae.

Yellow perch larvae were more common at open water than at beach stations. For example, 32, or 10% of open water samples contained yellow perch larvae in the peak year of 1977, while only 1, or 1% of beach-zone samples contained them. Abundances did not differ significantly between the 6- and 9-m contours at open water stations (ANOVA, P = 0.51). Through the years 1973-1979, samples contained yellow perch larvae 40 times at stations C and G (6 m) and 46 times at stations D and H (9 m) in the 0.5- through 6-m depth strata. However, abundance declined at greater depths; stations E and W (21 m) yielded yellow perch larvae only 13 times in the period 1975-1979. At 6- and 9-m stations, abundances were similar at all depth strata except the deepest, where yellow perch larvae were least frequently taken.

Yellow perch larvae appeared in 58 daytime and 71 nighttime samples at open water stations C, D, G, H, and R during the period 1973-1979. The difference was not significant (chi-square = 0.66, P > 0.25). Conversely, in the beach zone larval yellow perch were captured significantly more often at night than in daytime (chi-square = 4.45, P < 0.05). Most of the day-night difference was attributed to net avoidance. Increased rates of net avoidance by larger larvae probably contributed to the nearly complete absence of larvae larger than 10 mm TL from field samples, as well as the absence of larvae from samples after July (Fig. 19). Only 5% of the yellow perch larvae caught were > 7.5 mm TL; it is possible that the survival rate to 8 mm is about 5% (Clady and Hutchinson 1975). Thus, net avoidance was not the sole cause of the rarity of larger larvae. We believe that juvenile and adult alewife, which are common at this time in

inshore waters, preyed on a substantial number of newly-hatched yellow perch. Yellow perch larvae are passive at this stage (Houde 1969) and could easily be preyed upon by alewives.

Rainbow Smelt

Rainbow smelt larvae occurred in field samples over a short season, with first appearance in spring and persistence through part of the summer. At both beach and open water stations, rainbow smelt larvae were first taken in May, except for June 1976 in the beach zone and April 1973 in open water (Figs. 5-11). Unlike the three other abundant species, rainbow smelt larvae typically were most abundant the month they appeared. At beach stations, rainbow smelt rarely occurred in samples after the first month of capture; exceptions were 1973 (one June sample) and 1978 (one July sample). At open water stations, rainbow smelt larvae usually were most abundant the month they first appeared, and their numbers declined each month thereafter. spawning period for rainbow smelt is generally no more than 3 wk long with the peak rarely lasting more than a wk (Scott and Crossman 1973). The pattern of abundance of larval smelt in this study is therefore not unexpected. Rainbow smelt persisted into June in 1977 and 1978, July in 1975, and August in 1973 and 1979.

Rainbow smelt larvae were too rare to allow comparison of mean densities with ANOVA statistics. Instead the unit of analysis was the number of samples in which they occurred. Larval rainbow smelt were taken in significantly more tows at night than in daylight in 1973-1979 (chi-square = 26.27, P < 0.01). Whether the difference was due to daytime net avoidance or to greater nocturnal activity is unknown, but results of bottom sled tows in 1974 suggested that many rainbow smelt were on the bottom during the day and moved up into the water column at night (Jude et al. 1979b).

The depth distribution of larval rainbow smelt changed with the season. Of the 44 beach zone samples containing smelt larvae in 1973-1979, all but 2 were taken in the first month of occurrence of smelt in the beach zone. In contrast, 28% of the 97 open water samples with rainbow smelt were taken later than the month smelt first appeared. Rainbow smelt larvae generally persisted in open water samples longer than in beach samples (Figs. 5-11). These facts suggest that rainbow smelt spawned in the beach zone and larvae moved to open water soon after hatching. The suggestion was supported by length-frequency data (Fig. 20). In years with enough fish to draw conclusions (1974, 1975, 1979), larvae taken in May averaged slightly smaller at

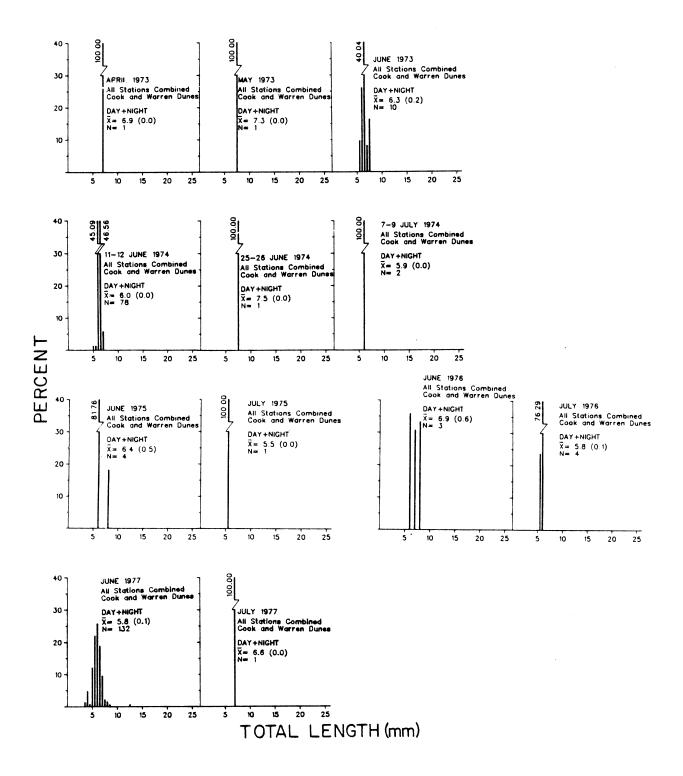


Figure 19. Length-frequency distributions of yellow perch larvae collected at all stations combined at the D. C. Cook Plant, 1973-1979. N = number of larvae, \bar{X} = mean length, standard error given in parentheses.

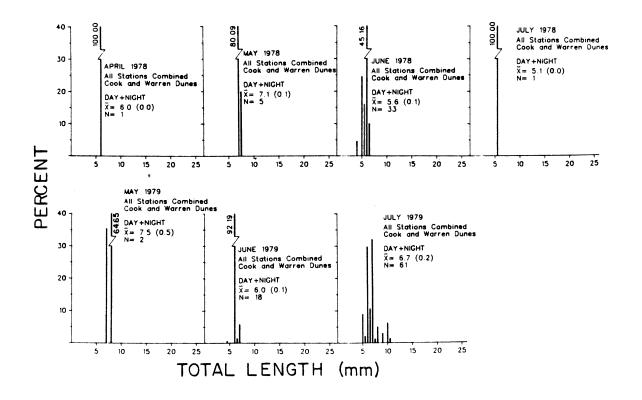


Figure 19. Continued.

beach stations than in open water. In 1974, when sampling was conducted weekly in May, smelt appeared at beach stations 2 wk earlier than at open water stations.

Other data did not support the suggestion of beach spawning and subsequent migration of larvae offshore. In April 1973, when beach samples were taken 2 wk before open-water samples, smelt larvae were collected in open water but not at the beach (Fig. 20). In 1979 a 7-mm larva was taken at station E (21 m) in July (Fig. 20); its origin (beach versus open water) was unknown. At the Campbell Plant, 105 km north of the Cook Plant, smelt apparently spawned in the open water zone in June as well as in the beach zone in April-May (Tin and Jude 1983, Jude et al. 1981).

Rainbow smelt larvae were equally abundant at 6- and 9-m stations but less common at 21-m stations. In 1973-1979, they were taken in 38 samples at stations C and G (6 m) and 41 samples at stations D and H (9 m) but in only 11 samples at stations E and W (21 m) in 1975-1979. Smelt occurred nearly uniformly through the water column at 6- and 9-m stations, except for their absence from surface samples in the daytime.

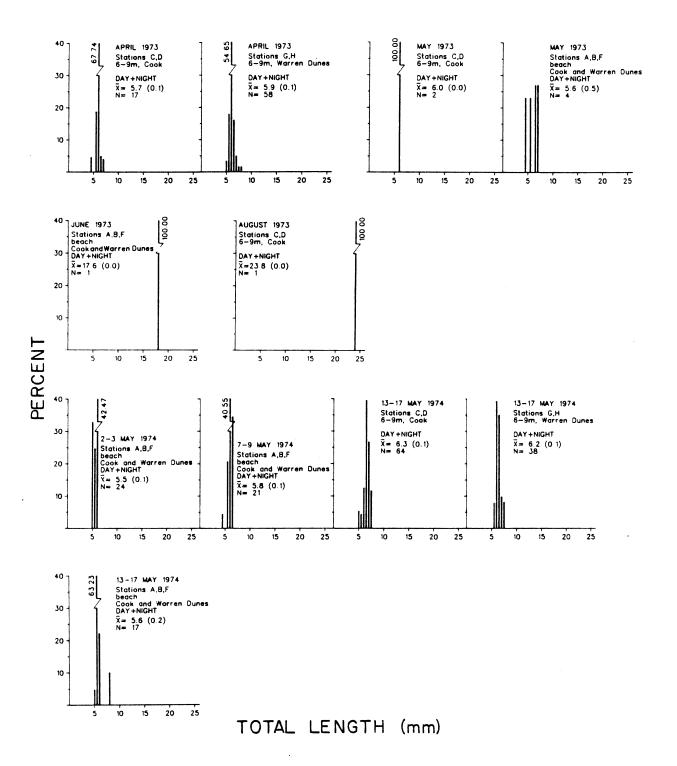


Figure 20. Length-frequency distributions of rainbow smelt larvae collected at beach and open water stations at the D. C. Cook Plant during 1973, 1974, 1975, and 1979. N = number of larvae, \bar{X} = mean length, standard error given in parentheses.

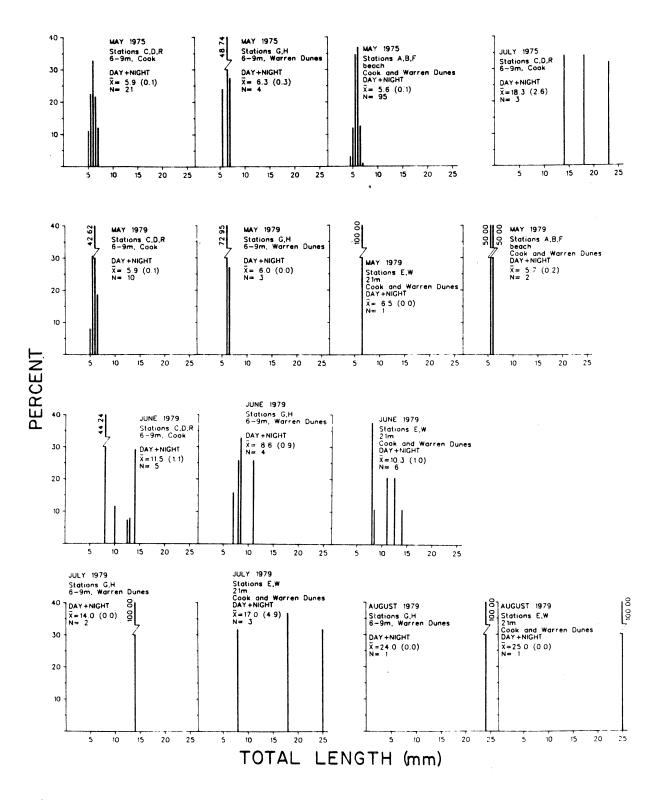


Figure 20. Continued.

The number of samples containing rainbow smelt larvae did not differ significantly between Warren Dunes and either north Cook or south Cook stations in preoperational versus operational years (north Cook: chi-square = 0.38, P > 0.50; south Cook: chi-square = 0.783, P > 0.25). The lack of significant differences implies no identifiable plant effect.

Less Abundant Species

Eleven species of larvae were captured in small numbers during 1973-1979. These included burbot, trout-perch, common carp, johnny darter, deepwater (formerly fourhorn) sculpin, slimy sculpin, ninespine stickleback, and unidentified members of the sucker, minnow, sculpin, and herring families. Burbot, trout-perch, common carp, and johnny darter were taken often enough to show regularities in distribution.

The ll records of burbot larvae included seven in April, three in May, and one in June. They may have been present earlier than records show, as sampling occurred only 1 yr for January, February, and March. Most burbot larvae were 3.5-5.0 mm TL, i.e., recently hatched (Mansfield et al. 1983), with one 6-mm and one 14-mm larva also taken. Burbot larvae were found during 2 yr at Cook stations E (21 m) and C (6 m) and Warren Dunes station W (21 m). Burbot was the only less abundant species whose larvae were taken at stations E and W, which are the farthest offshore.

The 10 records of trout-perch larvae were spread over each of the months from May through October, which suggests that trout-perch had the longest season of spawning and hatching of any species considered in this report. All 5 yr of November samples yielded no trout-perch larvae. Most trout-perch larvae were 4-7 mm TL, that is, recently hatched (Auer 1982). The exception was an 8-mm larva taken in May 1978. Larval trout-perch occurred consistently at the same stations, with records at beach station A (north Cook) in each of the 5 yr 1974-1978. They were taken only twice at Warren Dunes.

Common carp larvae were taken 10 times, all in the period June through August, mostly in July. They occurred at Cook beach stations A (north Cook) and B (south Cook) and open water station R (6 m, north Cook) in 1975 and 1976. Carp were never taken in preoperational years 1973-1974 or at Warren Dunes. Carp spawned at Cook plant stations in operational years, and we attributed this to the warm-water plume and currents produced by the heated discharge of the Cook plant. Thus carp spawning at Cook was a clear plant effect.

Johnny darter larvae were recorded in seven samples, all in June and July. They occurred at Warren Dunes station H (9 m) and south Cook station D (9 m) in 1976 and 1977. Deepwater sculpin larvae were collected in April 1978 at 9-m Cook station D and in May 1979 at 9-m Warren Dunes station H. Each of the six other species occurred in 1 yr only during the period 1973-1979 (Appendixes 6-12).

Fish Eggs

General Abundance Trends--

In the beach zone, eggs were most abundant in 1978 and least abundant in 1977. Yearly geometric mean densities (number per 1,000 m³) pooled over the months June through August for 1973 through 1979, were, respectively, 340, 130, 8, 15, 7, 450, and ll. In the open-water zone mean densities were much lower. For the years 1974 through 1979, based on the months June and July, yearly geometric means were 29, 38, 15, 3, 5, and 20, respectively. The year of peak abundance was 1975, and the lowest abundance year was 1977. Mean densities differed significantly among years at both beach and open water stations (ANOVA, P < 0.01). Yearly abundance trends in the beach and open water zones were uncorrelated (Spearman rank correlation coefficient = 0.01).

Species Composition --

Eggs were not identified to species, but based on the biology of the common species we could rule out all but alewife in open water samples and all but alewife and spottail shiner in the beach zone (except for eggs collected in the beach zone in January 1974 that were presumed to be burbot). During the season of high egg abundance, May through August, only four common species spawned in the study area: alewife, spottail shiner, rainbow smelt, and yellow perch. Yellow perch eggs are demersal and enclosed in a gelatinous mass and were thus generally unavailable to our nets. In addition, they were easily identified. Rainbow smelt spawn demersal, adhesive eggs with a stalk, chiefly before our May sampling period. Spottail eggs are likewise demersal and adhesive and should have been taken only when the water was turbulent enough to suspend them in the water column; this was likely in some beach samples. Only alewives spawn in the water column, though their eggs eventually sink to the bottom (Auer 1982). Thus, unless eggs were washed upward from the bottom by mechanical action, only those of the alewife should have been taken in the open water zone.

Seasonal Occurrence--

Occurrence of fish eggs was distinctly seasonal, with abundance rising sharply by June and falling sharply by August. Eggs were scarce or absent until June of most years at beach stations and every year at open water stations. In the beach zone, eggs first appeared in May 1973, 1975, and 1978. Eggs persisted in the beach zone through July in 1975 and 1979, August in 1976 and 1978, September in 1973 and 1977, and November in 1974 (Figs. 5-11).

Not only did eggs occur over a longer span each year in the beach zone than in open water, but egg densities were higher as well. In every month of every year that eggs were present, mean abundance was greater in the beach zone. Densities at 6-m stations usually exceeded those at 9-m stations; only in June 1975 and June 1978 did the reverse occur. For all 6 yr considered, the difference in fish egg densities between the 6- and 9-m contour fell short of statistical significance (ANOVA, P < 0.05). Overall geometric mean density in nighttime samples in June and July, 1974-1979, was 9 at 9-m stations D and H and 18 at 6-m stations C and G.

Diel Distribution--

At beach stations, eggs were significantly more abundant in nighttime samples (ANOVA, P < 0.01); exceptions were June and July 1974, July 1976, July 1977, and June 1979. At open water stations, more than 99% of the eggs were taken at night. Alewives are nocturnal spawners which broadcast demersal eggs (Graham 1956, Mansueti and Hardy 1967). The diel difference between the beach and open water zones probably occurred because eggs in open water sank to the bottom by mid- or late afternoon, when samples were taken, and were thus unavailable to daytime nets, while eggs at the beach remained suspended in the water column by wave action or disturbance and by seining. The major conclusion is that total abundance and diel distribution of eggs in beach and open water zones differed but were not comparable, presumably because eggs in open water became unavailable to sampling gear within 24 h of being spawned.

Distribution at Cook Plant Versus Warren Dunes--

Mean abundance of eggs in June through August 1973 to 1979 did not differ significantly among beach stations A, B, and F (ANOVA, P = 0.05), but each of the three stations followed a separate pattern through the years. Geometric mean egg densities were 5 at station A, 33 at station B, and 39 at station F (Warren Dunes) for all years. Cook station A had highest densities in 10

individual cases, including all three summer months in 1976 and 1977. Station B had the most eggs twice, in June 1973 and July 1975. Station F produced the greatest densities six times, including July and August of preoperational years 1973 and 1974. Considering that egg abundance at Warren Dunes station F generally fell between those of Cook stations A and B, no trend attributable to plant operation was identified.

Geometric mean abundance of eggs in nighttime samples in June and July 1974-1979 differed significantly between Warren Dunes and Cook plant areas in open water (ANOVA, P < 0.01). Cook stations C and D together (all depth strata combined) averaged 44 eggs per 1,000 m³, while Warren Dunes stations G and H averaged 4 eggs per 1,000 m³. At the Cook plant, abundance varied widely from month to month and year to year, from highs of 1,200/1,000 m³ in July 1975 and 880/1,000 m³ in June 1974 to a low of zero in July 1977 and 1978. Geometric mean densities at Warren Dunes stations varied from only 20/1,000 m³ in June 1976 to zero in July of 1974, 1977, 1978, and 1979. Mean abundance in the Cook plant area was similar to or greater than mean abundance at Warren Dunes in every month of every year, except June 1978. Years of high and low abundance were uncorrelated in the two areas (Spearman rank correlation = -0.01).

Because eggs at open water stations were presumably all alewives, egg abundance data are inconsistent with the fact that densities of newly hatched alewife larvae were similar at Cook and Warren Dunes during the study period. The probable explanation of the difference in egg abundance between the two areas is that of systematic differences in egg sampling times at the four stations. Egg abundance increased steadily from dusk to shortly after midnight (Table 7), presumably reflecting an increase in spawning. Eggs were much more abundant after 2300 h than before, and peaked after midnight. The stations were most often sampled in the sequence Warren Dunes (9 m, 6 m), followed Cook Plant (9 m, 6 m), and egg abundance increased in the same order (Table 8). In the few instances in which Warren Dunes stations were sampled later than Cook stations, egg abundance differences between the areas were reversed (July 1978), or obscured (June 1975), or else neither area produced eggs (July 1977, July 1978). In all cases where Cook stations were sampled later, they produced more eggs. In short, the area sampled last always produced as many or more eggs than the area sampled first; and a median difference of less than 2 h in sampling time between Cook Plant and Warren Dunes produced an 11-fold difference in geometric mean egg densities.

Table 7. Mean density of fish eggs in relation to sampling time. Samples were collected at night in June and July, 1973-1979. Data were pooled over 6- and 9-m stations C, D (Cook), G, and H (Warren Dunes) and all depth strata.

| Time Interval (h) | Number of Sampling Periods | Mean Density (no./1,000 m³) |
|----------------------|-------------------------------|-----------------------------|
| 2000-2059 | 3 | 33 |
| 2100-2159 | 7 | 61 |
| 2200-2259 | 10 | 171 |
| 2300-2359 | 10 | 348 |
| 2400-0059 | 6 | 3,395 |
| 0100-0159 | 7 | 2,419 |
| 0200-0259 | 2 | 276 |
| 0300-0359 | 1 | 15,546 |

Table 8. Station differences in egg abundance and sampling time. Densities were pooled over nighttime samples from all depth strata, June and July, 1973-1979. N = 248 samples.

| Station | H (9 m, Cook) | G (6 m, Cook) | D (9 m, Dunes) | C (6 m, Dunes) |
|-------------------------------|------------------|------------------|-------------------|-------------------|
| Median Time of Sample (h) | 2213 | 2301 | 2330 | 0118 |
| Median Density (No./1,000 m³) | 7 | 54 | 350 | 654 |

Comparison of field-caught and entrained fish eggs--

A chief aim of field sampling of fish eggs was to allow comparison with the abundance and season of occurrence of entrained eggs. Field samples from the 6- and 9-m depth contours were used for comparison with entrainment samples because the

cooling water intake was located between those two depths. Of five sampling stations at those depths (Cook stations C - 6 m, D - 9 m, R - 6 m; Warren Dunes stations G - 6 m, H - 9 m), the three at Cook Plant were used. Warren Dunes was omitted because egg densities differed greatly between Cook and Warren Dunes. Entrainment densities were assumed to be more similar to those observed at Cook stations (i.e., near the water intake) than at Warren Dunes.

All monthly field samples, May through August, were used, giving a total of 20 comparisons between field-caught and entrained eggs (4 mo in each of 5 yr). April and September field samples were omitted because they usually lacked eggs. We used entrainment samples taken on the nearest date and in the same diel period as field samples (Table 9).

Table 9. Sampling dates used to compare field-caught and entrained eggs at the Cook Plant, May through August, 1975-1979. F = field, E = entrainment.

| Diel - | | 1975 | 1976 | 1977 | 1978 | 1979 |
|--------------|-------|-------|-------|-------|-------|-------|
| Month Period | | F E | F E | F E | F E | F E |
| May | Day | 14 12 | 12 10 | 19 15 | 10 8 | 8 · 7 |
| | Night | 15 13 | 14 11 | 19 16 | 10 9 | 10 8 |
| Jun | Day | 10 10 | 22 22 | 15 13 | 14 12 | 12 6 |
| | Night | 10 11 | 22 23 | 16 14 | 22 18 | 13 7 |
| Jul | Day | 15 15 | 15 16 | 12 11 | 11 9 | 10 9 |
| | Night | 16 16 | 13 12 | 27 27 | 11 10 | 10 10 |
| Aug | Day | 12 11 | 10 10 | 9 7 | 9 7 | 8 7 |
| | Night | 13 12 | 11 9 | 10 8 | 29 29 | 16 16 |

Field densities were greatest in 1979, followed in order by 1975, 1976, 1978, and 1977 (Table 10). Entrainment densities were greatest in 1978, followed by 1976, 1979, 1975, and 1977. Densities of fish eggs in field and entrainment samples were uncorrelated (Spearman rank test, r = -0.03). Furthermore, the month of highest egg abundance, which was always either June or July, differed between field and entrainment samples in 3 of the 5 yr (1975, 1977, and 1979). The lack of correspondence in

timing of peak abundance, either year to year or month to month, suggested that the two sets of samples were drawn from different populations of eggs.

Egg densities in entrainment samples exceeded densities in field samples in all 5 yr and in almost every diel period and month each year (Table 10). Furthermore, entrainment densities for all years combined were seven times as great as field densities, i.e., 163,486 versus 24,930 (Table 10). Only in June 1979 did mean field egg density exceed entrained egg density, but even then, greater field densities probably resulted from differences in sampling dates. During 1979 no eggs were taken in entrainment samples on 7 June, but field samples, taken a week later on 13 June, contained large numbers of fish eggs. Because alewife larvae had not yet occurred in field samples on 13 June, alewife spawning probably began after the 7 June entrainment samples were collected, leading to the disparity observed between entrained and field-caught eggs.

The simplest interpretation of the lack of correlation between egg densities in field and entrainment samples is that we sampled two different egg populations. Some entrained water almost certainly was drawn from the lake bottom, where eggs eventually collected. Field plankton nets, in contrast, stayed above bottom and only sampled freshly deposited eggs or those stirred from the bottom because of currents or wave action. Evidence for a lake-bottom source of entrained eggs is that entrainment egg densities (summed over all 5 yr) were nearly five times as great as field densities at night (120,364 vs. 24,760) and about 254 times as great in daytime (43,122 vs. 170). Alewife eggs must have sunk to the bottom after spawning, because they were nearly absent from daytime field collections, yet 26% of entrained eggs were taken in daylight hours. Therefore nearly all day-entrained eggs must have come from the lake bottom. from the lake bottom presumably elevated night entrainment densities over night field densities as well. That alewife eggs were common on the bottom during these times was confirmed by divers' observations. Alewife eggs were also found in the stomachs of demersal feeders such as yellow perch (unpublished data, Great Lakes Res. Div., Univ. of Mich., Ann Arbor, Mich.).

Table 10. Mean monthly densities (no./1,000 $\rm m^3$) of fish eggs in field and entrainment samples at the D. C. Cook Plant, 1975-1979. Entr. = entrainment.

| Month | Sample Type | Diel Period | 1975 | 1976 | 1977 | 1978 | 1979 |
|-------|----------------|----------------|----------------|------------------|----------------|-------------------|-----------------|
| May | Field | Day Night | 0 10 | 0 | 0 | 20 0 | 0 |
| | Entr. | Day Night | 255 41 | 47 10 | 1 | 0 | 17 4 |
| Jun | Field | Day Night | 60 500 | 0 430 | 50 110 | 0 4 60 | 0 6,870 |
| | Entr. | Day Night | 1,866 7,142 | 1,996 11,310 | 1,521 7,134 | 3,050 57,280 | 0 |
| Jul | Field | Day Night | 10 6,380 | 30 4,470 | 0 180 | 0 | 0 5,350 |
| | Entr. | Day Night | 225 1,216 | 26,881 10,800 | 1,330 141 | 4,175 13,773 | 1,200 |
| Aug | Field | Day Night | 0 0 | 0 | 0 | 0 | 0 |
| | Entr. | Day Night | 0 6 | 53 130 | 0 0 | 1,035 | 5 147 |
| Total | Field | Day Night | 70 6,890 | 30 4,900 | 50 290 | 20 4 60 | 0 12,220 |
| | Entr. | Day Night | 2,346 8,405 | 28,977 22,250 | 2,853 7,275 | 8,360 71,053 | 1,600 11,364 |

ENTRAINMENT

Sampling Adequacy

Over 2,400 entrainment samples containing nearly 11,500 fish larvae and almost 366,000 eggs were processed from 1975 to 1979 (Table 11). Standard series sampling (see Methods) accounted for from 53% of those samples collected in 1975 to almost 90% of those collected in 1979. Supplemental samples were 44% of those collected in 1975 to 9% in 1979. Approximately 2% of all samples were discarded or not used in our analyses. Sixty percent of all fish larvae were collected in 1975 and 1976 (3,960 and 2,860 larvae) (Table 12). The numbers of larvae collected in entrainment samples during 1977 and 1979 were similar (1,888 and 1,955 larvae). Only 528 fish larvae were collected in 1978. Most (83%) fish larvae were alewives, 4% were spottail shiners, 2% were yellow perch, and rainbow smelt and johnny darter each contributed about 1%. The remaining species and groups added 1.5% (< 175 larvae) to these totals (Table 12). Approximately 6% of all larvae were severely damaged, making identification impossible, and 10 fish (< 0.09%) remained unidentified as a result of incomplete taxonomic information.

As a result of the very large quantity of water used for condenser cooling at the Cook Plant, current entrainment sampling techniques allow the inspection of only a minor fraction of the total intake water volume (Tables 13 and 14). During 1975-1979, a mean of 0.00173% of the total annual flow was sampled. During June, July, and August of those years, entrainment sampling was doubled (weekly) and the percentage of volume sampled increased to 0.00318% for the 3-mo period. During one-unit operation (1975-1977), June-August sample volumes were 0.00409% of the total; when Unit 2 went on-line in 1978 and 1979, sample volumes dropped to 0.00182% of the total June-August flow.

Sampling during 1974 --

During 1974, samples were collected during one 24-h period about once per month. Samples were collected every 6-h at grates 2 and 3. The plant circulated water sporadically during 1974 and an adequate sampling design was not developed. However, testing of equipment was accomplished. These data are reviewed by Jude et al. (1979b) and Jude and Godun (1978).

Table 11. Actual numbers of fish eggs and larvae observed in entrainment samples from the D. C. Cook Plant forebay, 1975-1979. Data include all entrainment samples collected.

| | | Sample | le category | | |
|---|--|---|----------------------|---|---|
| Species | Standard series | Supplemental series | Discarded samples | Total | Percent total |
| Alewife Spottail shiner Yellow perch Johnny darter Rainbow smelt Trout-perch Mottled sculpin Slimy sculpin Common carp Deepwater sculpin Burbot Ninespine stickleback Quillback | 6,986 331 200 83 68 30 26 11 2 | 2,436 159 8 41 23 9 6 | 38 7 6 1 | 9,460 497 208 124 33 33 16 15 1 | 82. 4.1. 0.33.33.36 0.1. 0.1. 0.1. 0.1. 0.1. |
| Unidentified sculpins Unidentified minnows Unidentified darters Unidentified coregonids | 23 15 1 | 22.52 | | 28 20 3 | 0.2 0.2 <0.1 <0.1 |
| Poor condition larvae Unidentified fish larvae Total larvae | 51 | 17 | | 69 1 | 6.1 <0.1 |
| Fish eggs | 224,829 | 131,430 | 409 | 365,668 | |

Table 12. Actual numbers of fish eggs and larvae observed in entrainment samples from the D. C. Cook Plant forebay, 1975-1979. Data include standard series and supplemental entrainment samples.

| | | | Year | | | |
|---|---|--|--|--------------------------------------|---|--|
| Species | 1975 | 1976 | 1977 | 1978 | 1979 | Total |
| Alewife Spottail shiner Yellow perch Johnny darter Rainbow smelt Trout-perch Mottled sculpin Slimy sculpin Common carp Deepwater sculpin Burbot Ninespine stickleback Quillback | 3,310 180 4 3 36 15 9 | 2,646 36 2 17 20 6 6 | 1,437 209 137 52 6 5 1 | 395 444 10 1 1 1 1 | 1,634 22 22 42 12 12 14 | 9,422 490 208 124 33 33 15 15 |
| Unidentified sculpins Unidentified minnows Unidentified darters Unidentified coregonids | 9 | 4 | 1333 | 4 | 9 | 28 20 3 |
| Poor condition larvae Unidentified fish larvae | 382 | 113 | 23 | 37 | 132 | 687 |
| Total larvae | 3,960 | 2,860 | 1,888 | 528 | 1,955 | 11,191 |
| Fish eggs | 36,260 | 125,895 | 85,910 | 85,776 | 22,418 | 356,259 |

Table 13. Comparison of condenser water flow and volumes of water filtered for entrainment samples (1,000 m³) at the D. C. Cook Plant, southeastern Lake Michigan, 1975-1979.

| | Annua (1, | Annual volume (1,000 m³) | 6 | June-Aug | June-August volume (1,000 m³) | 9 |
|-------|-------------------|--|------------------------|-------------------|--|-----------------------------------|
| Year | Condenser flow | Flow through entrainment gear | by entrainment gear | Condenser flow | Flow through entrainment gear | sampled by entrainment gear |
| .1975 | 1,297,804 | 22.9 | 0.00176 | 333,237 | 11.4 | 0.00342 |
| 1976 | 1,291,865 | 32.7 | 0.00253 | 373,688 | 16.2 | 0.00434 |
| 1977 | 1,137,723 | 25.8 | 0.00227 | 320,469 | 14.5 | 0.00452 |
| 1978 | 2,369,699 | 25.1 | 0.00106 | 668,564 | 10.7 | 0.00160 |
| 1979 | 2,475,630 | 25.5 | 0.00103 | 585,561 | 11.9 | 0.00203 |

Table 14. Monthly water volume (millions of cubic meters) pumped through the condenser circulating water system of the D. C. Cook Plant, southeastern Lake Michigan from 1975 to 1979. Unit 1 was operational since January 1975, Unit 2 since February 1978.

| Month | 1975 | 1976 | 1977 | 1978 | 1979 |
|-----------------|--------|--------|--------|--------|--------|
| January | 64.9 | 85.7 | 24.9 | 114.4 | 273.2 |
| February | 75.6 | 88.5 | 54.5 | 121.6 | 275.2 |
| March | 117.7 | 103.6 | 118.7 | 207.1 | 281.9 |
| April | 121.0 | 76.2 | | 115.9 | 173.7 |
| May | 125.8 | 86.0 | 97.4 | 90.4 | 100.5 |
| June | 122.8 | 122.7 | 93.5 | 194.4 | 33.3 |
| July | 81.7 | 120.5 | 103.6 | 224.5 | 227.7 |
| August | 128.7 | 130.5 | 123.3 | 249.6 | 324.6 |
| September | 125.2 | 109.0 | 97.7 | 277.6 | 314.3 |
| October | 132.2 | 137.9 | 112.4 | 298.8 | 245.9 |
| November | 90.6 | 126.2 | 76.3 | 202.8 | 107.3 |
| December | 111.6 | 105.1 | 120.9 | 272.5 | 118.0 |
| Annual total | 1,298. | 1,292. | 1,138. | 2,370. | 2,476. |

Sampling during 1975 --

Entrainment sampling during 1975, with more consistent water circulation, was largely a testing and development year. Generally, samples were taken during four diel periods (discussed earlier). Grate 3 was sampled at 5 m and 9 m, Unit 1 discharge at 5 m, and occasionally samples were drawn from grates 1 and 2 (Table 15). Additionally, long entrainment sampling was performed for 12-h periods starting at noon or midnight to Special studies of larvae and egg supplement regular sampling. forebay heterogeneity were also conducted to examine their vertical and horizontal stratification in the forebay. Refer to the section of this report discussing forebay heterogeneity studies for more detail. In general, samples taken at grate 3 and the Unit 1 discharge at 5 m were the only samples collected in 1975 that are directly comparable with samples collected in subsequent years.

Sampling during 1976 --

All entrainment samples collected from 1976 to the present were from a depth of 5 m. January through June 1976 samples were similar to most samples collected in 1975 (grates 3N-S, Unit 1 discharge). In July, sampling began at grate 2 (Table 16). Standard series samples were collected monthly in January and February, twice per month from March to May and September to December, three times in June, and four times each in July and August. Supplemental sampling consisted of long entrainment runs (long day and long night samples) during April, May, July, and August.

Sampling during 1977-1979 --

Entrainment sampling from 1977 to 1979 was remarkably consistent. Standard series sampling was conducted at grates 2, 3S, 3N, and the Unit 1 discharge, all from a depth of 5 m (Tables 17-19). Samples were collected twice per month, except in June, July, and August when sampling occurred weekly. The plant was not operating in January and February 1977 and no sampling was performed. Supplemental samples (miscellaneous long duration entrainment samples) were collected during May, June, and July 1977, August 1978, and August 1979. When Unit 1 was not operating, Unit 2 discharge samples were substituted for standard series sampling.

Table 15. Locations and numbers of entrainment samples collected in the forebay at the D. C. Cook Plant in 1975. Depth: depth (m) of sampling in the forebay. Grate: the location of forebay grates, see Figure 3 for reference - (1) grate 1, (2) grate 2, (3N) grate 3-north, (3S) grate 3-south, (3ND) grate 3-no N or S designation, (5) grate 5, (7) grate 7, (U1) Unit 1 discharge. Data represent both standard series and supplemental entrainment samples.

| | | | | | | Gr | ate | | | |
|--------------------------|-------------------|------------------|---|----|-------------|------------------|------------------|----|----|------------------|
| Month | Total no. samples | Depth (m) | 1 | 2 | 3N | 3S | 3ND | 5 | 7 | Ul |
| Jan Feb Mar Apr | 8 8 8 16 | 5 5 5 5 | | | | 3 4 4 8 | | | | 5 4 4 8 |
| May | 40 | 5 1 2 8 | 4 | 4 | 5 | | 3 3 2 4 | | | 14 |
| Jun | 77 | 5 1 9 | | | 26 | 3 23 | | | | 25 |
| Jul | 121 | 5 1 9 2 | | 3 | 25 | 13 12 | 12 12 12 | 3 | 3 | 26 |
| Aug | 108 | 5 1 9 | | 9 | 27 | 2 21 | 1 2 | 9 | 7 | 31 |
| Sep | 19 | 5 9 | | 7 | | 4 | | | | 8 |
| Oct Nov Dec | 15 21 34 | 5 5 5 | | | 4 4 8 | 4 4 8 | 4 6 8 | | | 3 7 10 |
| Total | 475 | | 4 | 16 | 107 | 113 | 69 | 12 | 10 | 145 |

Table 16. Locations and numbers of entrainment samples collected in the forebay at the D. C. Cook Plant in 1976. Depth: depth (m) of sampling in the forebay. Grate: the location of the forebay grate, see Figure 3 for reference - (2) grate 2, (3N) grate 3-north, (3S) grate 3-south, (3ND) grate 3-no N or S designation, and (Ul) Unit 1 discharge. Data represent both standard series and supplemental entrainment samples.

| | | | | | Grate | 2 | |
|-------|-------------------|-----------|----|-----|-------|-----|------|
| Month | Total no. samples | Depth (m) | 2 | 3N | 3S | 3ND | ָּบו |
| Jan | 17 | 5 | | 4 | 5 | | 8 |
| Feb | 24 | 5 | | 5 | 5 | 6 | 8 |
| Mar | 24 | 5 | | 8 | 8 | | 8 |
| Apr | 38 | 5 | | 8 | 3 | 15 | 12 |
| May | 33 | 5 | | 8 | 4 | 11 | 10 |
| Jun | 66 | 5 | | 22 | 22 | | 22 |
| Jul | 84 | 5 | 16 | 24 | 21 | | 23 |
| Aug | 92 | 5 | 22 | 24 | 22 | | 24 |
| Sep | 27 | 5 | 4 | 8 | 8 | | 7 |
| Oct | 30 | 5 | 7 | 8 | 7 | | 8 |
| Nov | 31 | 5 | 7 | 8 | 8 | | 8 |
| Dec | 40 | 5 | 4 | 16 | 8 | | 12 |
| Total | 506 | | 60 | 143 | 121 | 32 | 150 |

Table 17. Locations and numbers of entrainment samples collected in the forebay at the D. C. Cook Plant in 1977. Depth: depth (m) of sampling in the forebay. Grate: the location of the forebay grate, see Figure 3 for reference - (2) grate 2, (3N) grate 3-north, (3S) grate 3-south, and (U1) Unit 1 discharge. Data represent both standard series and supplemental entrainment samples. The plant was not operating during January and February, 1977.

| | | | | Gra | ate | |
|-------|----------------------|--------------|-----|-----|-----|-----|
| Month | Total no. samples | Depth (m) | 2 | 3N | 3S | Ul |
| Mar | 32 | 5 | 8 | 8 | 8 | 8 |
| Apr | 31 | 5 | 7 | 8 | 8 | 8 |
| May | 43 | 5 | 11 | 11 | 11 | 10 |
| Jun | 113 | 5 | 29 | 26 | 29 | 29 |
| Jul | 66 | 5 | 16 | 17 | 17 | 16 |
| Aug | 76 | 5 | 19 | 19 | 19 | 19 |
| Sep | 36 | 5 | 9 | 9 | 9 | 9 |
| Oct | 31 | 5 | 8 | 8 | 8 | 7 |
| Nov | 16 | 5 | 4 | 4 | 4 | 4 |
| Dec | 27 | 5 | 6 | 7 | 7 | 7 |
| Total | 471 | | 117 | 117 | 120 | 117 |

Table 18. Locations and numbers of entrainment samples collected in the forebay at the D. C. Cook Plant in 1978. Depth: depth (m) of sampling in the forebay. Grate: the location of forebay grate, see Figure 3 for reference - (2) grate 2, (3N) grate 3-north, (3S) grate 3-south, (3ND) grate 3-no N or S designation, (U1) Unit 1 discharge, and (U2) Unit 2 discharge. Data represent both standard series and supplemental entrainment samples.

| | | | | | Gra | te | | |
|-------|----------------------|--------------|-----|-----|-----|-----|----|----|
| Month | Total no. samples | Depth (m) | 2 | 3N | 3S | 3ND | Ul | U2 |
| Jan | 27 | 5 | 5 | 8 | 6 | | 8 | |
| Feb | 31 | 5 | 7 | 8 | 8 | | 8 | |
| Mar | 31 | 5 | 8 | 8 | .8 | | 7 | |
| Apr | 24 | 5 | 8 | 8 | 4 | | 4 | |
| May | 32 | 5 | 8 | 8 | 8 | | | 8 |
| Jun | 51 | 5 | 12 | 13 | 13 | | | 13 |
| Jul | 75 | 5 | 19 | 19 | 19 | | 4 | 14 |
| Aug | 78 | 5 | 17 | 18 | 21 | 1 | 8 | 13 |
| Sep | 36 | 5 | 9 | 9 | 9 | | | 9 |
| Oct | 27 | 5 | 8 | 4 | 7 | | 4 | 4 |
| Nov | 31 | 5 | 7 | 8 | 8 | | 8 | |
| Dec | 30 | 5 | 7 | 7 | 8 | | 4 | 4 |
| Total | 473 | | 115 | 118 | 119 | 1 | 55 | 65 |

Table 19. Locations and numbers of entrainment samples collected in the forebay at the D. C. Cook Plant in 1979. Depth: depth (m) of sampling in the forebay. Grate: the location of the forebay grate, see Figure 3 for reference - (2) grate 2, (3N) grate 3-north, (3S) grate 3-south, (U1) Unit 1 discharge, and (U2) Unit 2 discharge. Data represent both standard series and supplemental entrainment samples.

| | | | | | Grate | | |
|-------|-------------------|-----------|-----|-----|------------|-----|----|
| Month | Total no. samples | Depth (m) | 2 | 3N | 3 S | Ul | U2 |
| Jan | 27 | 5 | 8 | 3 | 8 | 8 | |
| Feb | 32 | 5 | 8 | 8 | 8 | 8 | |
| Mar | 28 | 5 | 8 | 8 | 4 | 8 | |
| Apr | 30 | 5 | 8 | 7 | 7 | 8 | |
| May | 27 | 5 | 8 | . 5 | 8 | | 6 |
| Jun | 53 | 5 | 15 | 10 | 16 | 12 | |
| Jul | 58 | 5 | 16 | 10 | 16 | 8 | 8 |
| Aug | 98 | 5 | 26 | 25 | 21 | 26 | |
| Sep | 33 | 5 | 9 | 8 | 7 | 8 | 1 |
| Oct | 29 | 5 | 8 | 8 | 5 | 8 | |
| Nov | 31 | 5 | 7 | 8 | 8 | 5 | 3 |
| Dec | 32 | 5 | 8 | 8 | 8 | 8 | |
| Total | 478 | | 129 | 108 | 116 | 107 | 18 |

Forebay Heterogeneity Studies

An unknown variable in most entrainment studies is the possible stratification of organisms either vertically or horizontally in the water column where sampling is conducted. These potentially serious errors are usually ignored, or statements about the highly-mixed nature of the water segment studied are used to justify arbitrarily-chosen sampling locations. A preliminary study, conducted in 1974 using 15-min samples, was designed to test for vertical stratification of fish larvae and eggs in the forebay. However, this sample was too small and results were confounded by many zero data points.

The 1975 forebay heterogeneity study was originally reported by Jude (1976). We will briefly review those results. ANOVA examination indicated no significant differences for total larvae, alewife larvae, or egg densities (Tables 20-22). Densities (no./1,000 m³) for total larvae were 98, 167, and 72 at 2 m, 5 m, and 8 m, respectively (Table 23). Alewife densities (no./1,000 m³) were 72, 128, and 54, while egg densities were 1,106, 2,200, and 919 for the three depths. The 5-m sample means exhibited the greatest densities in all three categories. The 5-m depth was therefore selected as the depth at which the grate study and the annual seasonal sampling program was to be conducted.

The horizontal distribution study revealed that there were no statistical differences among sampling locations in the forebay (Tables 20-22). Means were similar at grates 2 and 5, but grate 7 fish egg and fish larvae densities were consistently (but not statistically) lower. This may have been the result of reduced water flow under grate 7 as a result of a current deflector in the vicinity (Fig. 3). In 1975 only Unit 1 was operating and the Unit 2 area of the forebay experienced much lower water flow velocities because most of the water for Unit 1 is drawn from under grates 1, 2, and 3. Data from both segments of this study indicated striking diel variation in entrainment rates (Table 23). In general, more larvae were collected at night. This pattern continued in subsequent years.

Data collected from 1977 to 1979 were examined for evidence of larvae and egg stratification in the forebay. ANOVA was used to compare differences in densities among various forebay grates and intake and discharge samples (Table 24). Data examined were collected during June, July, and August - months of peak abundance. No significant differences occurred among samples collected at grates 2, 3N, and 3S or all intake samples vs. all discharge samples. Some variation did occur in 1978, a year of reduced entrainment densities. Diel effects were significant for

Table 20. Analysis of variance summary of densities (no./1,000 m³) for total larvae collected during depth-grate studies, 30 July-2 August 1975, in the D. C. Cook Plant forebay.

| Source of variation | đf | Mean square | F- statistic | Attained significance level |
|---|---------------|---------------------------------------|-------------------------|-----------------------------------|
| | | Depth study | | |
| Depth Diel Day | 2 5 1 | 21,246.293 35,512.023 1,311.885 | 2.515 4.203 0.155 | 0.407 0.354 0.761 |
| Depth X Diel Depth X Day Diel X Day | 10 2 5 | 6,010.691 2,839.836 20,788.211 | 0.711 0.336 2.460 | 0.737 0.773 0.448 |
| Depth X Diel X Day | 9 | 8,923.789 | 1.056 | 0.664 |
| Explained Residual Total | 34 1 35 | 14,680.488 8,449.188 14,502.449 | 1.738 | 0.547 |
| | | Grate study | | |
| Grate Diel Day | 2 5 1 | 765.432 2,175.754 436.020 | | 0.597 0.225 0.589 |
| Explained Residual Total | 8 26 34 | 1,590.381 1,454.061 1,486.136 | 1.094 | 0.399 |

Table 21. Analysis of variance summary of densities (no./1,000 m³) for alewife larvae collected during depthgrate studies, 30 July-2 August 1975, in the D. C. Cook Plant forebay.

| Source of variation | đf | Mean square | F- statistic | Attained significance level |
|---|---------------|-------------------------------------|-------------------------|-----------------------------------|
| | | Depth study | | |
| Depth Diel Day | 2 5 1 | 13,908.098 15,480.473 274.380 | 2.863 | 0.403 0.420 0.859 |
| Depth X Diel Depth X Day Diel X Day | 10 2 5 | 3,978.257 3,811.068 7,251.277 | | 0.729 0.644 0.573 |
| Depth X Diel X Day | 9 | 4,695.961 | 0.868 | 0.689 |
| Explained Residual Total | 34 1 35 | 7,296.254 5,407.313 7,242.285 | 1.349 | 0.605 |
| | | Grate study | | |
| Grate Diel Day | 2 5 1 | 901.558 2,087.310 680.846 | 0.685 1.586 0.517 | 0.513 0.199 0.478 |
| Explained Residual Total | 8 26 34 | 1,571.892 1,316.013 1,376.220 | 1.194 | 0.340 |

Table 22. Analysis of variance summary of densities (log no./1,000 m 3) for fish eggs collected during depthgrate studies, 30 July-2 August 1975, in the D. C. Cook Plant forebay.

| Source of variation | df | Mean square | F- statistic | Attained significance level |
|---|---------------|-------------------------|-----------------|-----------------------------------|
| | | Depth study | | , |
| Depth Diel Day | 2 5 1 | 0.838 1.002 2.041 | 0.332 | 0.802 0.857 0.562 |
| Depth X Diel Depth X Day Diel X Day | 10 2 5 | 0.385 0.485 0.676 | 0.161 | 0.981 0.870 0.912 |
| Depth X Diel X Day | 9 | 0.624 | 0.206 | 0.945 |
| Explained Residual Total | 34 1 35 | 0.675 3.021 0.742 | 0.223 | 0.958 |
| | | Grate study | | |
| Grate Diel Day | 2 5 1 | 0.526 2.120 1.093 | 3.677 | 0.414 0.012 0.180 |
| Explained Residual Total | 8 26 34 | 1.494 0.557 0.793 | 2.592 | 0.032 |

Table 23. Mean densities (no./1,000 m³) of fish larvae and fish eggs collected during vertical (depth study) and horizontal (grate study) distribution studies conducted 30 July-2 August 1975 in the D. C. Cook Plant forebay.

| | | | | |)Q | Depth Study | udy | | | | | |
|---------------------|-------|-----------|-----|-------|-------|-------------|--------------|-------|-------|---------------|---------------|----------|
| | Ď | Depth (m) | | | | Time | Time periods | | | 0 | Day | Grand |
| | 7 | D | 6 | 1500- | 1900- | 2300- | 0300- | 1100 | 1100- | 30-31 July | 1-2 August | |
| Total no. larvae | 86 | 167 | 72 | 36 | 193 | 218 | 66 | ១ខ | 46 | 102 | 122 | 112 |
| Alewife larvae | 72 | 128 | 54 | 32 | 137 | 156 | 73 | 50 | 42 | 79 | 06 | 89 22 |
| Fish eggs | 1,106 | 2,200 | 919 | 560 | 501 | 4,760 | 1,113 | 610 | 216 | 2,334 | 483 | 1,409 |
| | | | | | Gr | Grate Study | ddy | | | | | |
| | | Grate | | | | Time | Time periods | | | 0 | Day | Grand |
| | 2 | ū | 7 | 1500- | 1900- | 2300- | 0300- | 0700- | 1100- | 30-31 July | 1-2 August | |
| Total no. larvae | 51 | 20 | 37 | 29 | 70 | 48 | 22 | 65 | 45 | 42 | 49 | 46 |
| Alewife larvae | 45 | 46 | 30 | 24 | 57 | 35 | 17 | 65 | 45 | 37 | 43 | 40 |
| Fish eggs | 98 | 46 | 63 | 51 | 105 | 122 | 75 | 17 | 10 | 99 | 64 | 65 |

Table 24. ANOVA examination of forebay heterogeneity and intake/discharge densities. Months examined included June, July, and August 1977-1979 standard series data for total larvae, alewife larvae, and fish egg (log catch +1) densities (* indicates significance at the 0.05 level).

| | | ANOVA F | actor | |
|------|---|----------------------------|------------------------------|-------------------------------|
| Year | Category | Intake vs. discharge | Intake grates 2, 3N, & 3S | Diel period |
| 1979 | | | | |
| | Total larvae Alewife larvae Fish eggs | 0.8748 0.8225 0.5203 | 0.8491 0.8307 0.8901 | 0.0000* 0.0002* 0.0025* |
| 1978 | | | | |
| | Total larvae Alewife larvae fish eggs | 0.1728 0.1104 0.8635 | 0.1415 0.2063 0.4250 | 0.0000* 0.0002* 0.7270 |
| 1977 | | | | |
| | Total larvae Alewife larvae Fish eggs | 0.5718 0.7496 0.8917 | 0.4376 0.6469 0.7245 | 0.0000* 0.0000* 0.1740 |

almost every category, suggesting a strong diel variation in entrainment rates. These differences will be further detailed later in this report.

General Trends of Entrainment Losses, 1975-1979

An estimated 350 million fish larvae and almost 12 billion fish eggs have been entrained in the condenser circulating water system at the D. C. Cook Plant during the 5 yr from 1975 to 1979 (Tables 25-30 and Fig. 21). Thirteen species have been found in entrainment samples: alewife (Alosa pseudoharengus), spottail shiner (Notropis hudsonius), rainbow smelt (Osmerus mordax), yellow perch (Perca flavescens), trout-perch (Percopsis omiscomaycus), johnny darter (Etheostoma nigrum), slimy sculpin (Cottus cognatus), common carp (Cyprinus carpio), ninespine stickleback (Pungitius pungitius), mottled sculpin (Cottus bairdi), deepwater sculpin (Myoxocephalus thompsoni), burbot (Lota lota), and quillback (Carpiodes cyprinus). Additionally four groups could not be categorized to species: minnows, sculpins, coregonids, and darters. Approximately 6% of all fish larvae were damaged beyond recognition and less than 0.1% of all larvae were not identifiable at our current level of taxonomic sophistication (Table 1).

Entrainment of fish larvae generally began for the year in late March or April, peaked in June or July (corresponding to alewife spawning), and terminated in October or November as larvae and YOY fish migrated to deeper offshore zones. Alewife was the most abundant species entrained accounting for almost 85% (302 million) of the total number of larval fish entrained from 1975 to 1979 (Table 25). Spottail shiner was the second-most abundant species (3%), followed by yellow perch (1.5%), and rainbow smelt (0.8%). Johnny darter, trout-perch, common carp, and sculpins (mottled, slimy, and unidentified) were consistent but minor components of entrainment losses. Deepwater sculpin, ninespine stickleback, burbot, quillback, minnows, darters, and coregonids were rare.

Alewife

Seasonal abundance trends--

Alewife was always the most abundant species collected in Cook Plant entrainment samples. Entrainment estimates ranged from 27 million in 1977 to 126 million in 1979 (Tables 25-30). This species was entrained in almost every month from early April (1977), May (1975, 1976, and 1978), or June (1979) to late September (1975 and 1977), October (1976), or November (1978 and

Table 25. Estimates (in millions) of annual entrainment losses of fish larvae and fish eggs at the D. C. Cook Plant, southeastern Lake Michigan, 1975 to 1979. Calculations use actual reported flow rates of the circulating water system.

| | | γ. | Year of estimate | le le | | | |
|-------------------------|----------|------------|------------------|------------|------------|-------------|----------------|
| Taxon | 1975 | 1976 | 1977 | 1978 | 1979 | Total | % Total |
| Alewife | 63.708 | 53,7550 | 27.3888 | 31 098 | 125 6180 | 301 5678 | 7 28 |
| Spottail shiner | | 0.9361 | 2.760 | 1.681 | 1.8228 | 10,6099 | . . |
| Yellow perch | 0.17554 | 0.03807 | 1.3224 | 3.0655 | 0.3840 | 4.98551 | 4. |
| Rainbow smelt | 1.3608 | 0.4145 | 0.1795 | 0.3496 | 0.3726 | 2.6770 | 8.0 |
| Johnny darter | 0.0440 | 0.210 | 0.707 | 0.772 | 0.8105 | 2.5435 | 0.7 |
| Trout-perch | 1.079 | 0.2509 | 0.1456 | 0.0194 | 0.6288 | 2.1237 | 9.0 |
| Common carp | | 0.0912 | 0.0235 | 0.175 | 0.3603 | 0.6500 | 0.2 |
| Mottled sculpin | 0.152 | 0.146 | 0.0483 | | 0.131 | 0.4773 | 0.1 |
| Slimy sculpin | 0.2431 | 0.06092 | 0.0256 | 0.130 | | 0.45962 | 0.1 |
| Deepwater sculpin | | | | 0.178 | 0.0141 | 0.1921 | <0·1 |
| Ninespine stickleback | | | | 0.124 | | 0.124 | <0.1 |
| Burbot | | 0.0202 | | 0.102 | | 0.1222 | <0.1 |
| Quillback | | | 0.0628 | | | 0.0628 | 4 0.1 |
| Unidentified minnows | | | 0.1248 | | 0.8138 | 0.9386 | 0.3 |
| Unidentified sculpins | 0.1899 | 0.0892 | 0.0918 | 0.175 | 0.0905 | 0.6364 | 0.2 |
| Unidentified coregonids | | | 0.0850 | | | 0.0850 | <0·1 |
| Unidentified darters | | | 0.0276 | | | 0.0276 | <0·1 |
| Poor condition | 6.555 | 2.8642 | 0.4274 | 3.352 | 5.9935 | 19.1921 | 5.5 |
| Unidentified larvae | 0.1693 | 0.0349 | 0.0887 | 0.100 | | 0.3929 | 0.1 |
| Total larvae | 77.08664 | 58.91119 | 33,5088 | 41.3215 | 137.0399 | 347.86803 | |
| Total eggs | 743.1879 | 2,269.4543 | 1,320.301 | 5,840.8138 | 1,392.5408 | 11,566.2978 | |

Table 26. Estimates (in millions) of entrainment losses of fish larvae and fish eggs during 1975 at the D. C. Cook Plant, southeastern Lake Michigan. Calculations use actual reported flow rates of the circulating water system. No fish eggs or larvae were found in entrainment samples between 1 January and 25 January or between 30 October and 31 December 1975.

| Taxon | 26 Jan- 4 Mar | 5 Mar- 29 Mar- 28 Mar 2 May | 26 Jan- 5 Mar- 29 Mar- 4 Mar 28 Mar 2 May | 3 May- 1 Jun- 31 May 27 Jun | 1 Jun- 27 Jun | 28 Jun- 3 Aug- 31 Aug- 28 Sep- 2 Aug 30 Aug 27 Sep 29 Oct | 3 Aug- 30 Aug | 31 Aug- 27 Sep | 3 Aug- 31 Aug- 28 Sep- 30 Aug- 27 Sep- 29 Oct | Total | % Total |
|-----------------------|------------------|--------------------------------|--|--------------------------------|------------------|--|------------------|-------------------|--|----------|------------|
| Alewife | | | | 0.275 | 33.0 | 28.7 | 1.43 | 0.303 | | 63 708 | 82 6 |
| Spottail shiner | | | | ! ! | 2.05 | 1.36 |) |) | | 3.41 | 4.4 |
| Rainbow smelt | | | | 1.17 | 0.0291 | 0.0367 | 0.125 | | | 1.3608 | - 8 |
| Trout-perch | | | | | 0.122 | | | 0.206 | 0.751 | 1.079 | 1.4 |
| Slimy sculpin | | | | | 0.229 | | 0.0141 | | | 0.2431 | 0.3 |
| Yellow perch | | | 0.126 | | 0.0405 | 0.00904 | | | | 0.17554 | 0.5 |
| Mottled sculpin | | | | | 0.152 | | | | | 0.152 | 0.5 |
| Johnny darter | | | | | | | 0.0440 | | | 0.0440 | 0.1 |
| Unidentified sculpins | | | | | 0.169 | 0.0209 | | | | 0.1899 | 0.2 |
| Poor condition | | | | 0.130 | 2.86 | 3.13 | 0.132 | 0.303 | | 6.555 | 8 .5 |
| Unidentified larvae | | | | 0.108 | 0.0181 | 0.0432 | | | | 0.1693 | 0.2 |
| Total larvae | | | 0.126 | 1.683 | 38.6697 | 33.29984 1.7451 0.812 | 1.7451 | 0.812 | 0.751 | 77.08664 | |
| Fish eggs | 1.08 | | 1.19 | 149. | 438. | 153. | 0.893 | 0.0249 | | 743.1879 | |

Table 27. Estimates (in millions) of entrainment losses of fish larvae and fish eggs during 1976 at the D. C. Cook

| Taxon | 1 Jan- 2 Feb | 3 Feb 3 2 Mar 31 | 3 Mar 31 Mar | - | Apr- 3 May- 2 May 31 May | 1 Jun- 2 Jul | 3 Jul- 31 Jul | 1 Aug- 26 Aug | Aug- 27 Aug- 1 Oct- 6 Aug 30 Sep 31 Oct | 1 Oct- 31 Oct | 1 Nov 8 Dec | Total | % Total |
|-----------------|-----------------|---------------------|-----------------|-----------------------------|-----------------------------|-----------------|------------------|------------------|--|------------------|----------------|---|------------|
| Alowife | | | | | 0 134 | 83 | 20 | 4 91 | 0 287 | 0940 | | 7 | 6 |
| Spottail shiner | | | | | | 0.163 | 0.356 | 0.136 | | 0.0681 | | 0.9361 | 1.6 |
| Rainbow smelt | | | | 0.252 | 0.126 | | 0.0365 | | | | | 0.4145 | 0.7 |
| Trout-perch | | 0.0478 | | | | | 0.0829 | | 0.0777 | _ | 0.0425 | 0.2509 | 0.4 |
| Johnny darter | | | | | | | 0.210 | | | | | 0.210 | 0.4 |
| Mottled sculpin | | | | | | 0.146 | | | | | | 0.146 | 0.2 |
| Common carp | | | | | | 0.0263 | 0.0447 | 0.0202 | | | | 0.0912 | 0.5 |
| Slimy sculpin | | | | | | 0.0536 | 0.00732 | | | | | 0.06092 | 0.1 |
| Yellow perch | | | | | | 0.0289 | 0.00917 | | | | | 0.03807 | 0 |
| Burbot | | | | 0.0202 | | | | | | | | 0.0202 | 0 |
| Unidentified | | | | | 6000 | 000 | | | | | | 0 | (|
| scribin | | | | | 0.0003 | 0.0203 | | | | | | 0.0892 | N. O |
| Poor condition | | | 0.0713 | | 0.0939 | 0.686 | 1.74 | 0.273 | | | | 2.8642 | 4.9 |
| Jarvae | | | | | | 0.0349 | | | | | | 0.0349 | <0.1 |
| Total larvae | | 0.0478 | 0.071 | 0.0478 0.0713 0.2722 0.4222 | 0.4222 | 9.9896 | 41.98659 5.3392 | 5.3392 | 0.5777 0.1621 0.0425 | 0.1621 (| 0.0425 | 58.91119 | |
| Fish eaas | 2 77 3 04 | 5 | 0 | ,,,, | 70 | 7 11 1 | 000 | 7 | | • | | | |

Table 28. Estimates (in millions) of entrainment losses of fish larvae and fish eggs during 1977 at the D. C. Cook Plant, southeastern Lake Michigan. Calculations use actual reported flow rates of the circulating water system. No fish eggs or larvae were found in entrainment samples between 1 March and 4 April 1977 or between 1 October and 31 December 1977. No entrainment sampling was performed between 1 January and 28 February 1977.

| Taxon | 5 Apr- 6 May | 7 May- 28 May | 29 May- 1 Jul | 2 Jul- 31 Jul | 1 Aug- 26 Aug | 27 Aug- 30 Sep | Total | % Total |
|---|-----------------|------------------|------------------|------------------|------------------|-------------------|-----------|-------------|
| Alewife Snottail shiner | 0.127 | 0.0258 | 10.2 | 14.7 | 4.79 | 0.546 | 27.3888 | 81.7 |
| Yellow perch | | 0.0263 | 1.25 | 0.0461 | | | 1.3224 | 9 8 9 .0 |
| Johnny darter Rainbow smelt | 0.0679 | | 0.529 | 0.178 | | | 0.707 | 2 C |
| Trout-perch | | | 0.0207 | 0.0290 | 0.0335 | 0.0624 | 0.1456 | 0.0 |
| Quillback | 0.0628 | | 1 | | | | 0.0628 | 0.5 |
| Mottled scuipin Slimv sculpin | | 0.0256 | 0.0483 | | | | 0.0483 | o c |
| Common carp | | | | 0.0235 | | | 0.0235 | 0.7 |
| Unidentified minnows | 0.0668 | | | 0.0580 | | | 0.1248 | 0.4 |
| Inidentified sculpins | i d | | 0.0918 | | | | 0.0918 | 0.3 |
| Unidentified coregonids Unidentified darters | 0.830 | | 0.0276 | | | | 0.0850 | 0.0 |
| Poor condition Unidentified larvae | 0.0887 | | 0.140 | 0.197 | 0.0904 | | 0.4274 | +.3 0.3 |
| Total larvae | 0.4982 | 0.0777 | 14.268 | 13.1426 | 4.9139 | 0.6084 | 33.5088 | |
| Fish eggs | 5.64 | 12.1 | 1,060 | 242. | 0.561 | | 1,320.301 | |

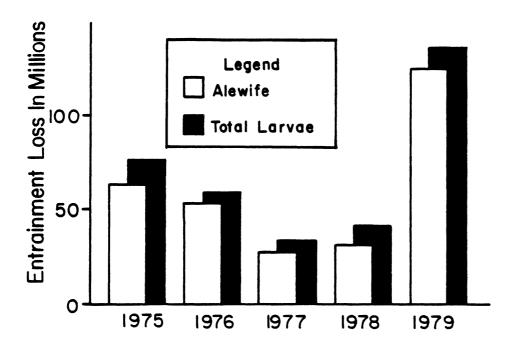
Table 29. Estimates (in millions) of entrainment losses of fish larvae and fish eggs during 1978 at the D. C. Cook Plant, southeastern Lake Michigan. Calculations use actual reported flow rates of the circulating water system. No fish eggs or larvae were found in entrainment samples between 5 April and 2 May or between 2 December and 31 December 1978.

| Taxon | 1 Jan- 29 Jan- 1 Mar- 3 May- 28 Jan 28 Feb 4 Apr 30 May | 1 Mar- 4 Apr | Mar- 3 May- 4 Apr 30 May | 31 May- 2 Jul | 3 Jul - 28 Jul | 29 Jul- 26 Aug- 4 Oct- 2 Nov- 25 Aug 3 Oct 1 Nov 1 Dec | 26 Aug- 3 Oct | 4 Oct- 2 Nov- | 2 Nov- 1 Dec | Total | % Total |
|---------------------------------------|--|-----------------|-----------------------------|------------------|-------------------|---|------------------|---------------|-----------------|------------|------------|
| Alewife | | | 0.798 | 4.87 | 9.55 | 4.15 | 2.83 | 8.64 | 0.260 | 31.098 | 75.3 |
| Yellow perch | | | 0.167 | 2.56 | 0.269 | 0.0695 | | | | 3.0655 | 7.4 |
| Spottail shiner | | | | 0.136 | 0.740 | 0.805 | | | | 1.681 | 4 |
| Johnny darter | | | | 0.442 | 0.161 | 0.169 | | | | 0.772 | |
| Rainbow smelt | | | 0.0526 | 0.158 | | 0.139 | | | | 0.3496 | |
| Deepwater sculpin | | 0.178 | | | | | | | | 0.178 | |
| Common carp | | | | | | 0.175 | | | | 0.175 | |
| Slimy sculpin | | | | 0.130 | | | | | | 0.130 | |
| Ninespine stickleback | | | | | | | 0.124 | | | 0.124 | |
| Burbot | | 0.102 | | | | | | | | 0.102 | |
| Trout-perch | | | | | | 0.0194 | | | | 0.0194 | |
| Unidentified sculpins | | | | 0.175 | | | | | | 0.175 | 4.0 |
| Poor condition Unidentified larvae | | | | 0.836 | 0.775 | 0.880 | 0.286 | 0.575 | | 3.352 | 9.1 |
| Total larvae | | 0.28 | 1.0176 | 9.407 | 11.495 | 6.4069 | 3.24 | 9.215 | 0.260 | 41.3215 | |
| Fish eggs | 114. 0.0618 | | 0.292 2,300 | | 3,320 | 106. | 0.344 | 0.116 | ល | 5,840.8138 | |

Table 30. Estimates (in millions) of entrainment losses of fish larvae and fish eggs during 1979 at the D. C. Cook Plant, southeastern Lake Michigan. Calculations use actual reported flow rates of the circulating water system. No fish eggs or larvae were found in entrainment samples between 4 December and 31 December 1979.

| Taxon 2 Feb 27 Alewife Spottail shiner Johnny darter Trout-perch Yellow perch Rainbow smelt Common carp | 2 Feb 27 Feb 30 Mar 2 May | ֓֞֞֜֜֜֜֞֜֜֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֡֓֓֓֡֓֓֓֓֡֓֜֜֓֡֓֡֓֡֓֜֜֜֡֓֡֓֡֡֡֡֓֡֡֡֓֜֡֡֡֡֓֜֜֝֡֡֡֜֝֡֡֡֡֜֝֡֡֡֜֝ | | | | | | | | 30 Oct- | | |
|---|---------------------------|--|--------|-----------------|--------|---------|---------|---|--------|---------|------------|------------|
| Alewife Spottail shiner Johnny darter Trout-perch Yellow perch Rainbow smelt Common carp | | Mar | | 30 May' 31 May' | 30 Jun | 28 Jul | 25 Aug | 29 Jul- 26 Aug- 2 Oct- 30 Oct- 25 Aug Oct 29 Oct 3 Dec | 29 Oct | 3 Dec | Total | % Total |
| Spottail shiner Johnny darter Trout-perch Yellow perch Rainbow smelt Common carp | | | | | 2.25 | 0 | 27.3 | 4 07 | r C | Caso | 10E 61BO | 0 1 7 |
| shiner Johnny darter Trout-perch Yellow perch Rainbow smelt Common carp | | | | |) |)) |) | 2 | ? | 0.000 | 0919.671 | |
| Johnny darter Trout-perch Yellow perch Rainbow smelt Common carp | | | | | 0.0528 | 0.300 | 1.47 | | | | 1 R22R | 7 |
| Trout-perch Yellow perch Rainbow smelt Common carp | | | | | 0.272 | 0.492 | 0.0465 | | | | 0 8 105 | |
| Yellow perch Rainbow smelt Common carp | | | | | 0.0551 | 0.0977 | 0.104 | 0.0640 0.308 | 0.308 | | 0.6288 | 0.0 |
| Rainbow smelt Common carp | | | | | 0.164 | 0.220 | | | | | 0.3840 | 0 |
| Common carp | | | 0.0991 | | 0.0150 | 0.0375 | 0.221 | | | | 0.3726 | 0.3 |
| • | | | | | 0.0452 | 0.253 | 0.0621 | | | | 0.3603 | 0.3 |
| Mottled | | | | | | | | | | | 1 | , |
| sculpin | | | | | 0.131 | | | | | | 0.131 | C |
| Deepwater | | | | | | | | | | | |) |
| sculpin | | | | | 0.0141 | | | | | | 0.0141 | ٥٠. م |
| Unidentified | | | | | | | | | | | | |
| minnow | | | | | 0.0348 | 0.363 | 0.416 | | | | 8138 | 0 |
| Unidentified | | | | | | 1 |) | | | | | |
| sculpin | | | | | 0.0905 | | | | | | 0.0905 | 0.1 |
| Poor condi- | | | | | | | | | | | | |
| tion | | | 0.0775 | | 0.646 | 3.13 | 2.14 | | | | 5.9935 | 4.4 |
| Total larvae | | | 0.1766 | | 3.7705 | 94.8932 | 31.7596 | 4.5640 1.808 | 1.808 | 0.0680 | 137.0399 | |
| Fish eggs 13.7 0 | 0.304 0.71 | 712 | 0.518 | 0.848 | 12.0 | 705. | 659. | 0.370 | 0.0888 | - | 1,392.5408 | |

'No fish larvae, only eggs, were found during the first monthly entrainment sampling period (7-8 May). Larvae were collected during the second sample period (24-25 May), but the plant was not operating during that period.



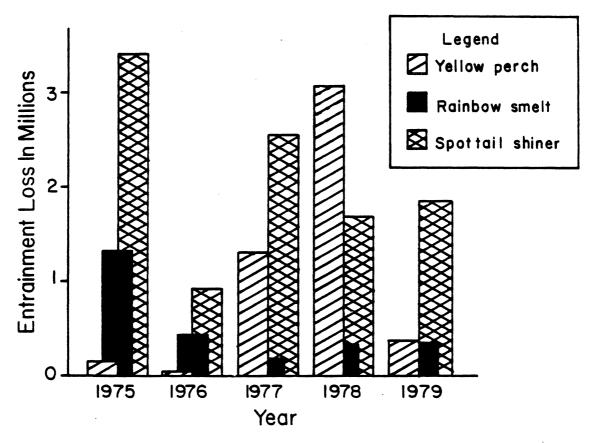


Figure 21. Entrainment losses at the D. C. Cook Plant, southeastern Lake Michigan, 1975-1979, for alewife, yellow perch, rainbow smelt, spottail shiner, total larvae, and fish eggs.

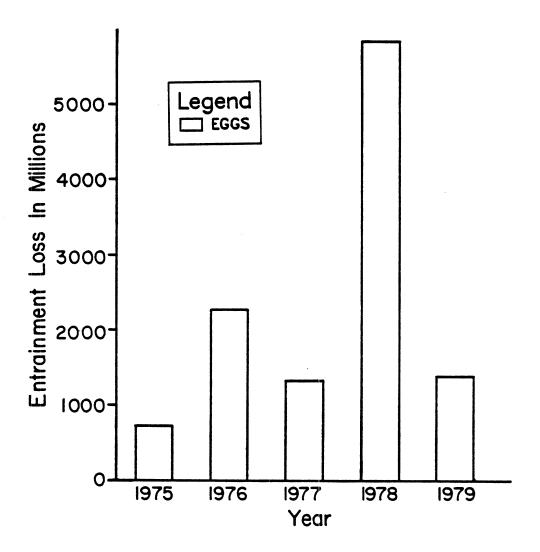


Figure 21. Continued.

1979). Entrainment peaks occurred in June (1975) or July (1976-Yolk-sac larvae consistently appeared in entrainment samples as lake temperatures approached 15-18°C (Table 31 and Figs. 22-26). Data suggest that although alewife larvae were present in the nearshore areas at the Cook Plant for an extended period throughout the summer, densities usually peaked over a 1-3-wk period immediately following spawning and hatching. greatest mean densities in a given month period (24-h sampling) for all samples combined were: 1,831 larvae per 1,000 m³ (8-9 July 1975), 1,039 larvae per 1,000 m³ (20-21 July 1976), 379 larvae per 1,000 m³ (21-23 June 1977), 140 larvae per 1,000 m³ (25-26 July 1978), and 892 larvae per 1,000 m³ (26-27 July 1979) (Figs. 27-31). Greatest individual sample densities in each year were: 9,599 larvae per 1,000 m³ (8 July 1975), 2,711 larvae per 1,000 m³ (20 July 1976), 1,580 larvae per 1,000 m³ (6 July 1977), 878 larvae per 1,000 m³ (30 June 1978), and 2,606 larvae per 1,000 m³ (26 July 1979). In all years the greatest overall monthly mean density occurred in July.

Annual alewife larvae entrainment density maxima from 1975 to 1979 appeared to be related to the thermal regime in the lake. The lowest annual peak density (140 larvae per 1,000 m³) occurred during sampling on 25-26 July 1978. Mean June (13.7°C) and July (14.1°C) temperatures in that year were 12% and 21% lower than the 1975-1979 means (June - 15.5°C, July - 17.9°C). The secondlowest annual maximum mean density (379 larvae per 1,000 m³) occurred during sampling on 21-23 June 1977 following relatively warm May $(12.4 \, ^{\circ}\text{C}, 1975 - 1979 \, \text{mean} - 11.0 \, ^{\circ}\text{C})$ water temperatures but cooler June (14.7°C) temperatures (Table 32). During 1975, the year of greatest annual maximum mean alewife density (1,831 larvae per 1,000 m³ on 8-9 July), mean June (16.2°C) and July (19.5°C) temperatures were approximately 5% and 9% greater than 1975-1979 means. A similar pattern existed in 1976. In 1977 and 1978 reduced water temperatures appeared to be consistently related to the occurrence of repeated upwellings in late May and June.

Length-frequency distribution --

The majority of alewife larvae collected in Cook Plant entrainment samples were yolk-sac larvae (\leq 5-mm TL, Auer 1982). The annual percentages falling into this category were: 1975 (94%), 1976 (73%), 1977 (77%), 1978 (74%), and 1979 (62%)(Tables 33-37). The relative abundance of larvae appeared to be related to offshore temperatures. Relatively few larger larvae were found in 1975 entrainment collections. Truncation of the length-frequency distribution may have been related to cooler August water temperatures (Table 32). Increased relative abundance of

Table 31. Mean densities (no./1,000 m³) of yolk-sac larvae and fish eggs collected at various water temperatures in the intake forebay at the D. C. Cook Plant, southeastern Lake Michigan. Data were collected during entrainment sampling from 1975 to 1979. Length ranges (mm TL) used in this analysis were: alewife (AL) < 5, spottail shiner (SP) < 5, rainbow smelt (SM) < 6, yellow perch (YP) < 8 (Auer 1982). SpP = species. The 7°C interval, for example, contains data from water temperatures from 6.1 to 7°C.

| | | | | | | | | | | | | - | | | | | | | | | | |
|------------------|------|-------------------|------------|-----------|--------------|-----|-----------|-------------|-------------|--------------|--------------|-------------------|-------------|-----------|------------|-------------|------------|------|----------------|------|----|------|
| • | | | | | | | | | | | Temper | Temperature | (2) | | | | | | | | | |
| Yr/ Spp | 7 | 80 | 6 | 5 | = | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 29 |
| 1975 AL | | | 4 | 35 | 130 | 63 | 34 | 26 | 27 | 78 | 270 | 262 | 1032 | 84 | 206 | 295 | 358 | 831 | 319 | 104 | 29 | 198 |
| N W | 06 | 56 | 49 | | 0 4 | | | 15 | | 47 | - | 24 16 | 56 | œ | 79 | 81 | 26 | 32 | | 24 | | |
| S | 30 3 | 3992 | 297 | 157 4 | 4363 | 165 | 165 2098 | 27 | 79 | 4 18 4 18 | 1328 | 15 3058 | 4247 | 5003 | 23 3185 | 458 | 46 3141 | 5315 | 2544 1774 4239 | 1774 | | 1155 |
| 1976 AL | | | | | ß | 4 | | 147 | 37 | 213 | 313 | | 127 | 78 | 4 | 182 | 547 | 49 | | | | |
| | 35 | 45 | | | | 5 | | | | | 29 | | 15 | 4 | | 22 | 30 | | | | | |
| YP Eggs | | 44 | | | 59 | 20 | 9 | 7325 | 284 | 2416 | 11275 | | 13 12418 | 5355 | 4146 | 14 23553 | 11496 | 9397 | | | | |
| 1977 AL | | | 4 | 13 | | | 53 | 29 | 31 | | 255 | 348 | 188 | 33 | 73 | 94 | 212 | | | | | |
| n V | | | | 9 | | | | 21 | 19 | | 139 | 160 | 51 | œ | 11 | | 45 | | | | | |
| YP Fggs | | | 133 5 | 35 535 | | 195 | 2026 | 373 2199 | 79 25839 | 12 30303 | 14 10959 | 69 8515 | 7559 | 1900 | 31 9866 | 159 | 2227 | | | | | |
| 1978 AL SP | | | | 84 | 1 | | 21 | 92 34 | 33 | | 16 | 173 | | 128 44 | 45 34 | | თ | | | | | |
| SM YP Eggs | | 11 22 72 86 | 36 8689 | 34 | 649 1 | 14 | 44 534 | | 16538 | | 2852 | 60 86 30244 | ., | | 6225 | 22 | 25 | ប | | | | |
| 1979 AL SP | | 60 | 37 | | | | 65 | 57 | 24 | 246 | 62 | 334 64 | 32 | ø | 244 | 51 | | 74 | | | | |
| YP Eggs | | | 82 | | | | 35 | 196 | 18 6004 | 59 4539 | 234 | 234 13817 | 1232 | 27 | 5193 | 162 | 10 | 143 | | | | |

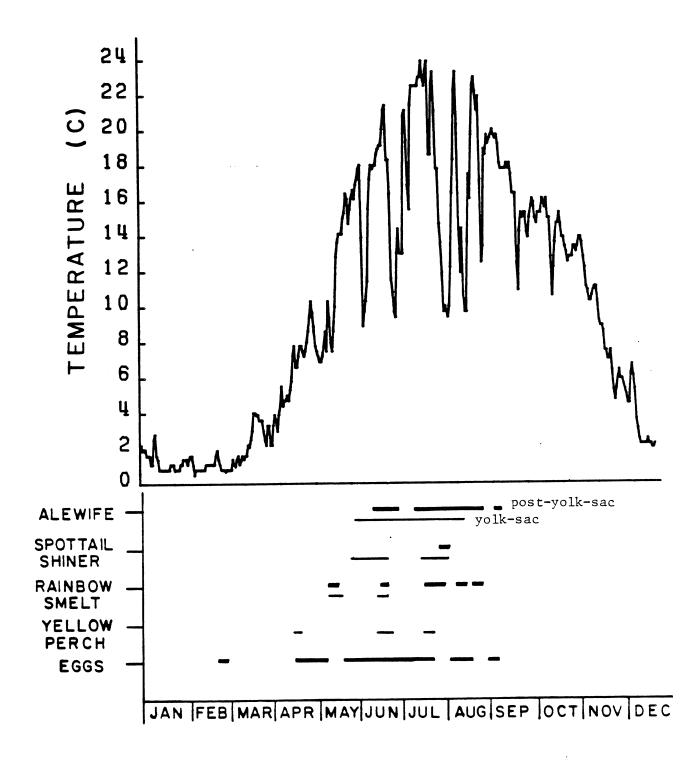


Figure 22. Seasonal distribution of alewife, spottail shiner, rainbow smelt, and yellow perch larvae, and fish eggs collected in entrainment samples at the D. C. Cook Plant, southeastern Lake Michigan, 1975. Also shown is the nearshore thermal regime at St. Joseph, Michigan.

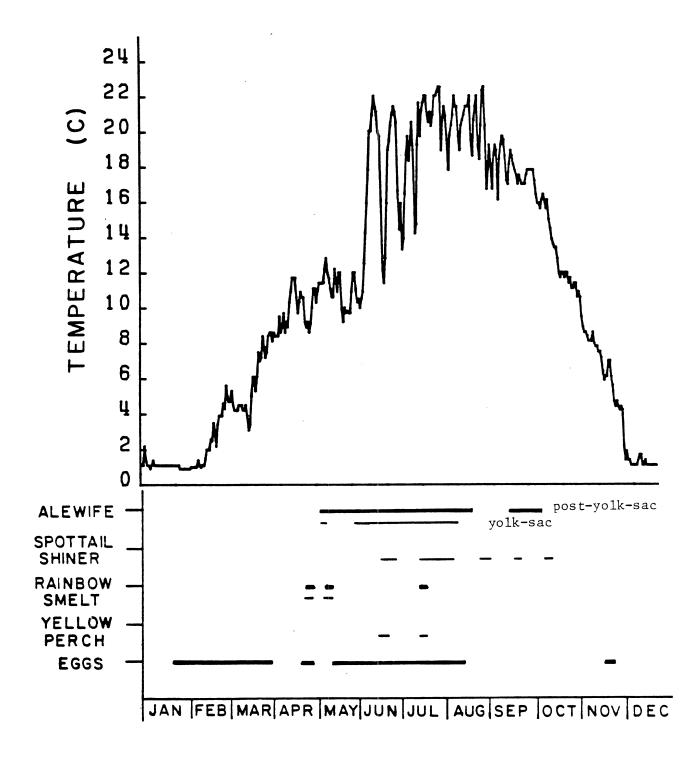


Figure 23. Seasonal distribution of alewife, spottail shiner, rainbow smelt, and yellow perch larvae, and fish eggs collected in entrainment samples at the D. C. Cook Plant, southeastern Lake Michigan, 1976. Also shown is the nearshore thermal regime at St. Joseph, Michigan.

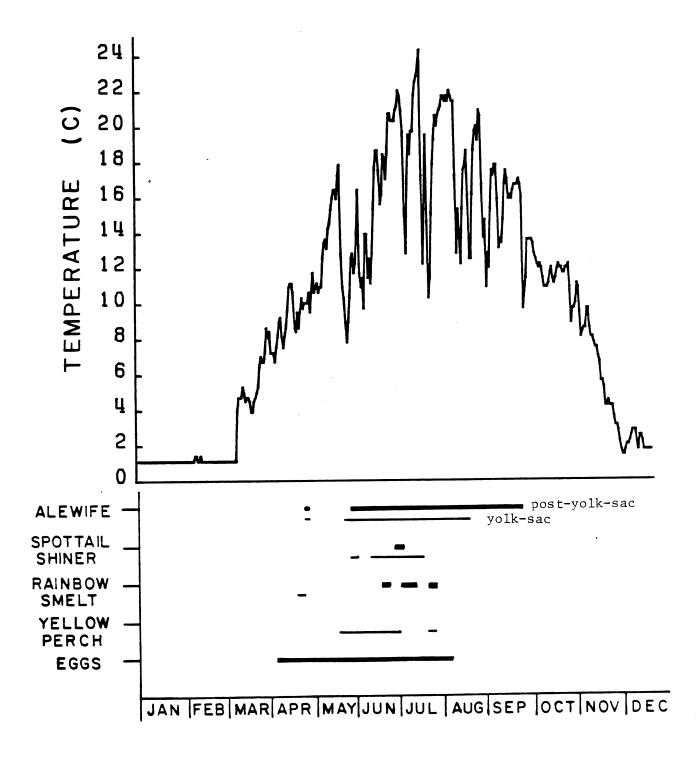


Figure 24. Seasonal distribution of alewife, spottail shiner, rainbow smelt, and yellow perch larvae, and fish eggs collected in entrainment samples at the D. C. Cook Plant, southeastern Lake Michigan, 1977. Also shown is the nearshore thermal regime at St. Joseph, Michigan.

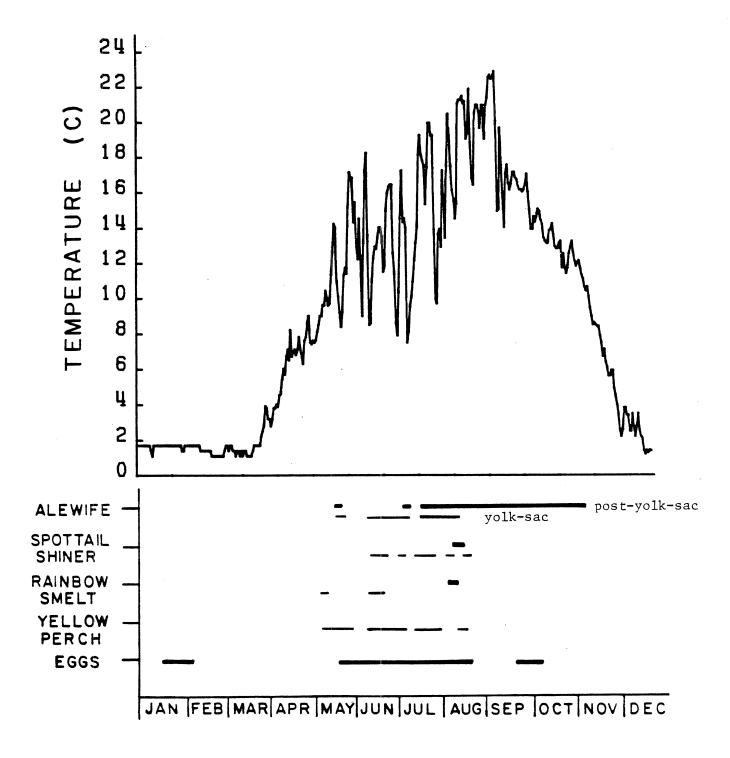


Figure 25. Seasonal distribution of alewife, spottail shiner, rainbow smelt, and yellow perch larvae, and fish eggs collected in entrainment samples at the D. C. Cook Plant, southeastern Lake Michigan, 1978. Also shown is the nearshore thermal regime at St. Joseph, Michigan.

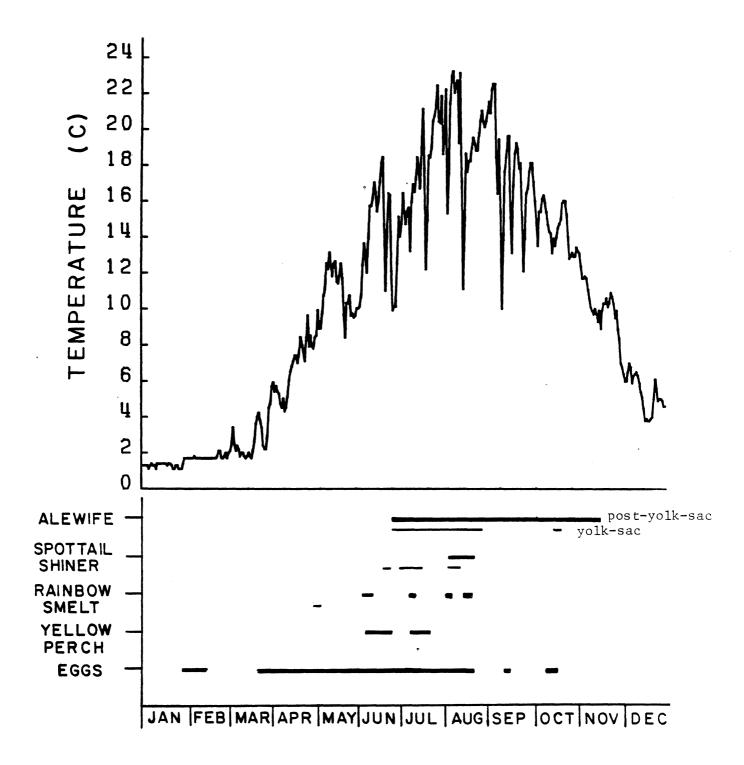


Figure 26. Seasonal distribution of alewife, spottail shiner, rainbow smelt, and yellow perch larvae, and fish eggs collected in entrainment samples at the D. C. Cook Plant, southeastern Lake Michigan, 1979. Also shown is the nearshore thermal regime at St. Joseph, Michigan.

Table 32. Lake Michigan water temperatures (°C) measured at the St. Joseph Municipal Water Plant, 16 km north of the Cook Plant, 1973-1979; intake depth - 6 m. Data are monthly means of the daily average of maximum and minimum temperatures.

| ent vilianes give parelle succ | | | | | |) | Month | | | | | |
|--|--------------------------|---------------------------------|---------------------------------|---------------------------------|--------------------------------------|--------------------------------------|--|--------------------------------------|--------------------------------------|--------------------------------------|-----------------------------------|---------------------------------|
| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 1973 1974 1975 1976 1977 1978 | 1.2 1.3 1.1 1.1 | 1.1 1.1 2.1 1.1 1.4 | 3.7 2.1 5.4 3.5 1.5 | 7.5 5.4 9.6 8.7 5.6 | 11.3 10.9 11.0 12.4 10.2 | 14.9 16.2 16.7 14.7 13.7 | 18.8 17.2 19.5 19.2 18.6 14.1 18.0 | 16.5 15.5 20.5 18.5 17.9 | 16.2 17.3 18.0 15.9 18.4 | 13.3 14.5 14.6 12.1 14.0 | 9.2 10.9 8.3 8.5 10.1 | 3.0 4.1 2.0 2.5 3.1 |
| 1973- 1979 | 1.2 | 1.3 | 3.3 | 7.2 | 11.0 | 15.5 | 17.9 | 18.3 | 17.1 | 14.1 | 9.5 | 3.5 |

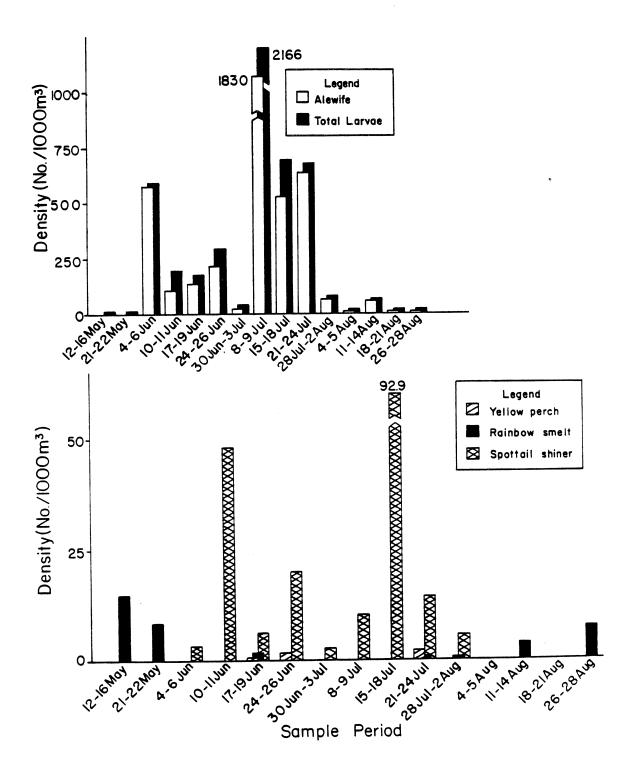


Figure 27. Density estimates of entrained fish larvae (no./1,000 m³) for alewife, spottail shiner, rainbow smelt, and yellow perch larvae, and fish eggs found in intake water used for condenser cooling at the D. C. Cook Plant, 1975.

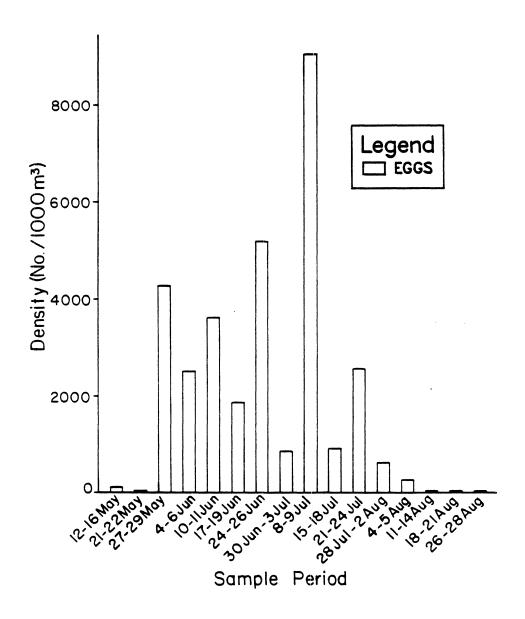


Figure 27. Continued.

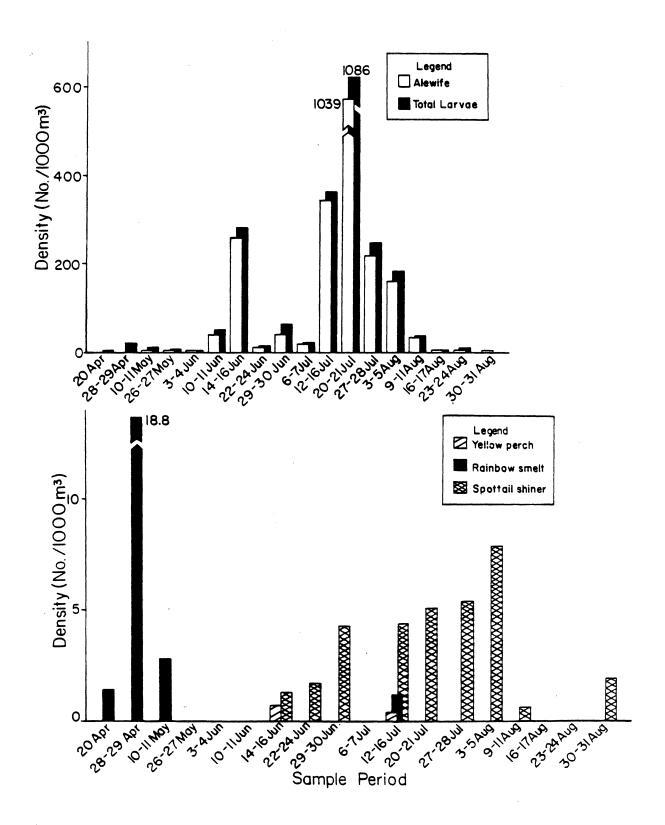


Figure 28. Density estimates of entrained fish larvae (no./1,000 m³) for alewife, spottail shiner, rainbow smelt, and yellow perch larvae, and fish eggs found in intake water used for condenser cooling at the D. C. Cook Plant, 1976.

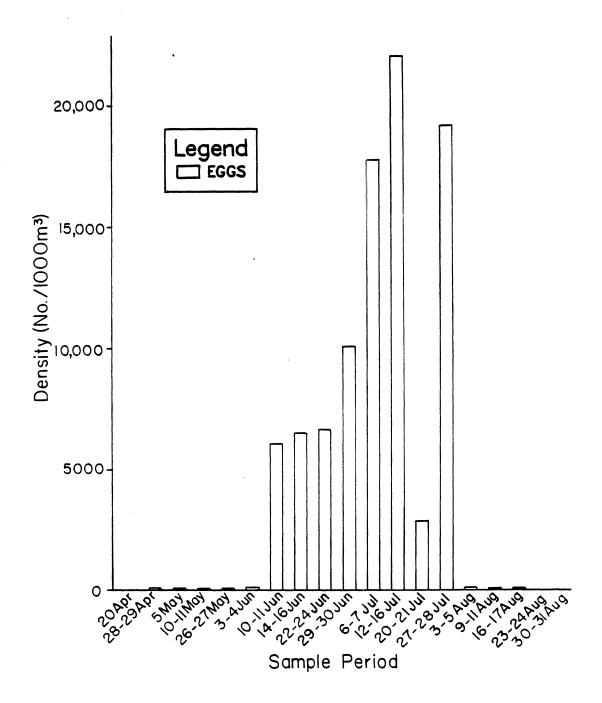


Figure 28. Continued.

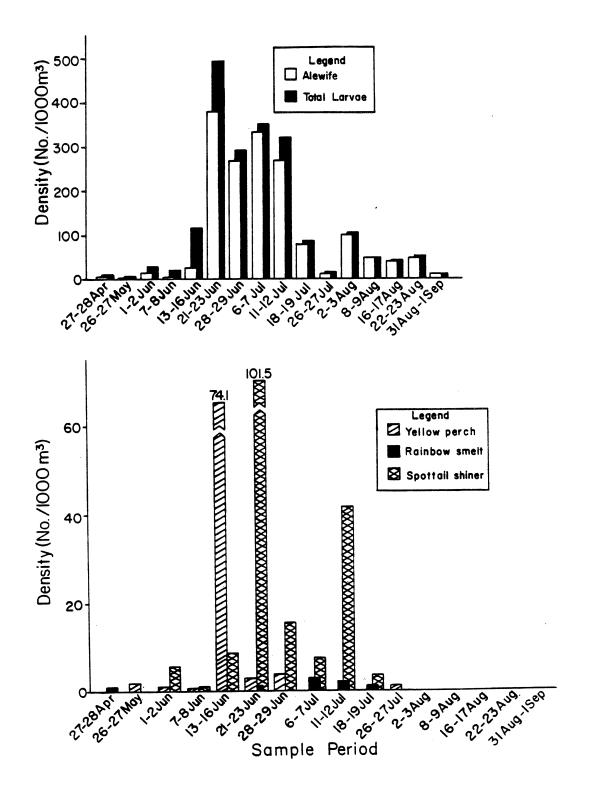


Figure 29. Density estimates of entrained fish larvae (no./1,000 $\rm m^3$) for alewife, spottail shiner, rainbow smelt, and yellow perch larvae, and fish eggs found in intake water used for condenser cooling at the D. C. Cook Plant, 1977.

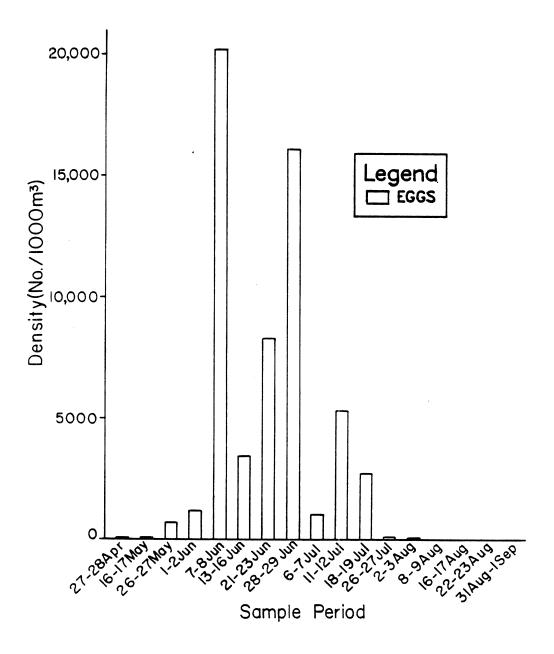


Figure 29. Continued.

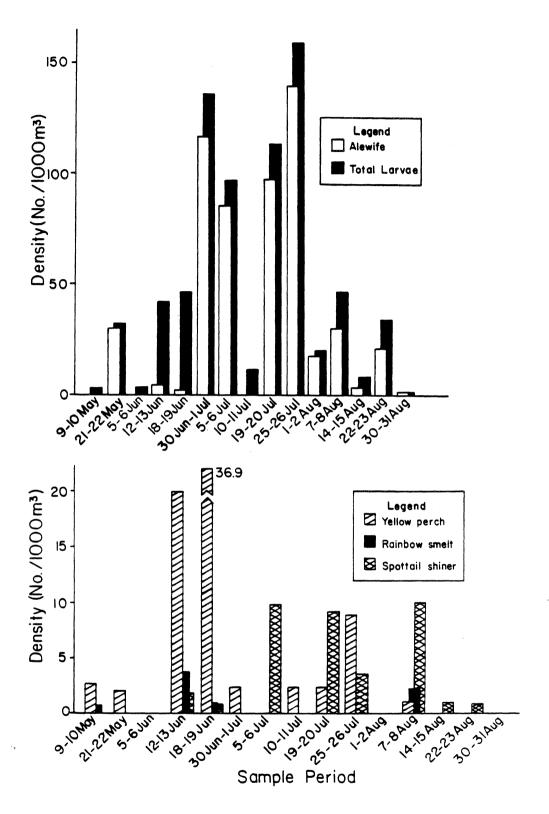


Figure 30. Density estimates of entrained fish larvae (no./1,000 m³) for alewife, spottail shiner, rainbow smelt, and yellow perch larvae, and fish eggs found in intake water used for condenser cooling at the D. C. Cook Plant, 1978.

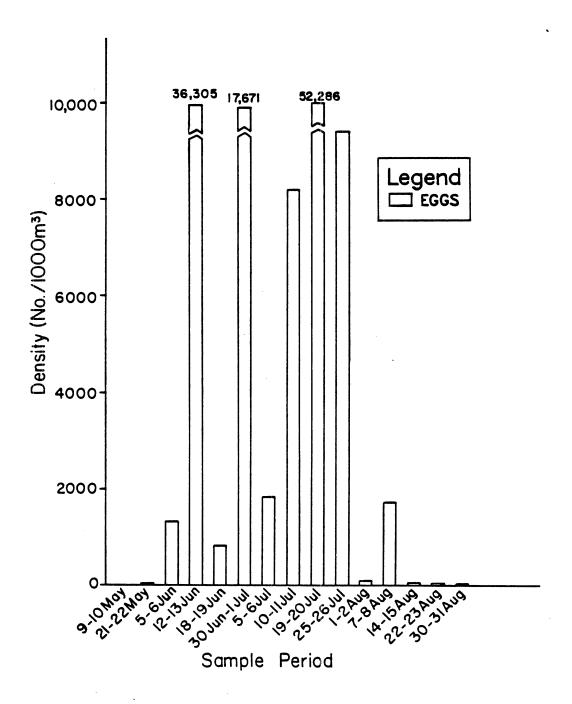


Figure 30. Continued.

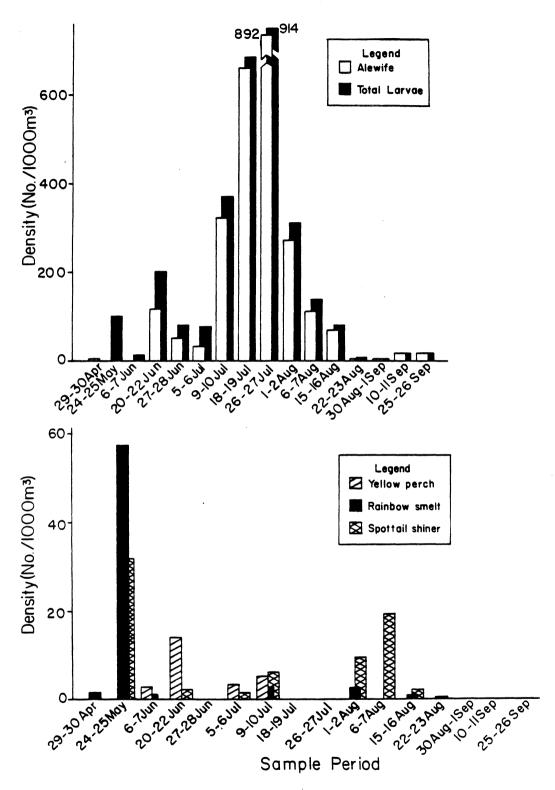


Figure 31. Density estimates of entrained fish larvae (no./1,000 m³) for alewife, spottail shiner, rainbow smelt, and yellow perch larvae, and fish eggs found in intake water used for condenser cooling at the D. C. Cook Plant, 1979.

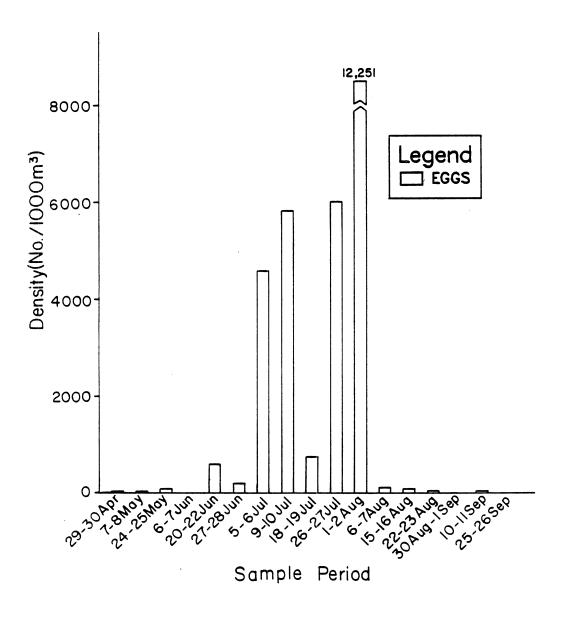


Figure 31. Continued.

Table 33. Length-frequency distribution of alewife larvae (sum of densities in no./1,000 m³) entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1975. Length intervals are in mm (e.g., the 5-mm interval includes all larvae from 4.1 to 5.0 mm TL). Blanks indicate zero densities. Sample sizes are in parentheses.

| | | | | | | | | | | | Ler | ıgth | Length interval (mm) | /a] (| (mm) | | | | | | | | |
|----|-----------|--------------|------|-------|----|-------|---------|-------|----------------|-----|-----|------|----------------------|-------|------|----|-------|-----|-------|---|------|----------|-------------------------------|
| | Date (N) | 2 | 2 | Э | 7 | 4 | 5 | 9 | 7 | 8 | 6 | 10 | 10 11 12 13 14 15 | 2 13 | 14 1 | | 16 17 | 18 | 19 2C | | 21 2 | 2 23 | 16 17 18 19 20 21 22 23 24 25 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | _ | 2,264 | - | | 124 | | | | | | | | | | | | | | | | |
| | | | _ | 6 | | | 80 | | | | | | | | | | | | | | | | |
| | 17-19 Jun | | 45 | 290 | - | | 564 | 70 | 23 | | | | | | | | | | | | | | |
| | | | 96 (| | - | | 485 | 26 | | | | | | | | | | | | | | | |
| 30 | Jun-3 | | _ | വ | | | 204 | | | | | | | | | | | | | | | | |
| | | | 34 | 4. | œ | | ,786 | | 1 3 | | | | | | | | | | | | - | 13 | |
| | | | _ | 2,161 | e, | | | 23 | | | | | 18 | m | | | | | | | | | |
| | | | 32 | - | œ | 715 2 | 2,564 3 | 320 3 | 349 1 | 192 | 185 | 103 | | | • | 13 | 35 | 112 | 5 | | | | |
| 28 | | | _ | 338 | - | | | 181 | | | | 56 | 56 | 51 | 52 7 | œ | | 56 | | | | | |
| | | | _ | _ | | | 43 | | | | | | | | | | | | - | 1 | | | |
| | 11-14 Aug | g (13) | _ | | | | 17 | | 25 | | | | 53 | 3 36 | 19 | 38 | 34 36 | 198 | 69 17 | | | 52 58 | |
| | | | _ | | | | | | | | | | | | | | | | | | 7 | | |
| | | | ·. | | | | | | | | | | | | | 7 | | | | | _ | ₽ | |
| | 8-9 Sep | | | | | | | | | | | | | | | | | | 22 | ~ | | | |

Table 34. Length-frequency distribution of alewife larvae (sum of densities in no./1,000 m³) entrained at the D. C.

| all larvae from 4.1 to 5.0 mm TL). Blanks indicate zero densities. Sample sizes are in parentheses. | | | | | | | | | | | | | | | | | | | | | | |
|---|-----------------|---------|---------|-------|-----|-----|-----|----------|-----|-----|----------------------|-------|--------|-----|----|-------|-----|--------|-----|----|------|-------|
| | | | | | | | | | Len | gth | Length interval (mm) | val | (mm) | | | | | | | | | |
| Date (N) | 2 | 3 | 4 | ນ | 9 | 7 | ω | б | 5 | Ξ | 12 | 13 | 14 | 15 | 16 | 17 18 | | 19 20 | 21 | 22 | 23 2 | 24 25 |
| | | | | | | | | | | | | | | | | | | | | | | |
| May (| (16) | | | 12 | 7 | | | | | | | | | | | | | | | | | |
| _ | $\widehat{\Xi}$ | | | | Ξ | | | | | | | | | | | | | | | | | |
| _ | (12) | | 2 | _ | | | | 9 | | | | | | | | | | | | | | |
|) unp | (12) | 188 | 3 238 | | 28 | | | | | | | | | | | | | | | | | |
| _ | (18) | 364 | 7 | _ | 207 | 9 | | | | | | | | | | | | | | | | |
|) unp | (12) | 25 | | | 50 | | | | | | | | | | | | | | | | | |
| _ | (12) | | 241 | | | 56 | | | | | | | | | | | | | | | | |
| _ | (12) | | 126 | | | | | | | | 56 | | | | | _ | m | | | | | |
|) [3 | (11) | 3,080 5 | | _ | | 455 | 123 | | | | 231 2 | 240 2 | 03 2 | 34 | | 105 7 | 7.1 | 6 | | σ | | 37 37 |
|) [] | (16) | 689 | ٠. | 4 | 239 | 268 | | 66 1 | 177 | 203 | | 430 1 | 199 3 | 323 | 06 | | | | 187 | 34 | | |
| _ | 19) | 310 | 0 1,592 | 2 621 | | | | | | | | | | 8 | | | | | | | | |
| _ | (20) | 34 | 1 49 | | | | | 242 3 | | | | | | 38 | | 122 9 | | | 27 | | 119 | ď |
| 1 Aug (| (16) | | æ | 3 21 | | | | | | | 82 | 69 | 5 | 75 | 20 | | 25 | | | | | 2.5 |
| Aug (| (16) | | | | | | | | | | | | |) |) | | 18 | , 1 | . 6 | | • | _ |
| 4 Aug (| 16) | | | | | 49 | | | | | | | | | | | | | | | | 20 |
| Sep (| = | | | | | | | | | | | | | 4 | 27 | _ | 13 | | | | | i |
| Oct (| 12) | | | | | | | | | | | | | | 40 | | , | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |

Table 35. Length-frequency distribution of alewife larvae (sum of densities in no./1,000 m³) entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1977. Length intervals are in mm (e.g., the 5-mm interval includes all larvae from 4.1 to 5.0 mm TL). Blank entries indicate zero densities. Sample sizes are in parentheses.

| | | | | | | | | | | | - | | | | | | | | | | - | | | |
|----------------|---------------|----------|-----|-------|--------------|---------|-----|-----|----|-----|----------------------|--------------|--------------|-------------------|------|----|----|----|----|----------------|----|----|-------------|-------|
| | | | - 1 | | | | | | | | Length interval (mm) | th tr | nter | val | (mm) | _ | | | | | | | | |
| Date (N) 2 | _ | 7 | | ဗ | 4 | ស | 9 | 7 | 8 | 6 | 10 | 11 | 12 | 10 11 12 13 14 15 | 14 | 15 | 16 | 17 | 8 | 16 17 18 19 20 | 21 | 22 | 21 22 23 24 | 24 25 |
| | ` | 1 | | | | | | | | | | | | | | | | | | | | | | |
| Apr (| _ | | | | | 15 | | ភ | _ | | | | | | | | | | | | | | | |
| _ | _ | 9 | | | 7 | | | | | | | | | | | | | | | | | | | |
|) un | _ | 3) | | 107 | | 5 18 | | | | | | | | | | | | | | | | | | |
|) unp | _ | <u>c</u> | | 19 | | 8 | 9 | | | | | = | | | | | | | | | | | | |
|) unp | _ | 9 | | 75 | | | | | 58 | | | | | | | | | | | | | | | |
| $\overline{}$ | $\overline{}$ | <u>c</u> | | 2,200 | | 5 1,502 | 101 | | 12 | 13 | | 12 | | 57 | | | | | | | | | | |
|) un | _ | 9 | | 204 | - | _ | | 368 | | 19 | | | 90 | 21 | 38 | 59 | 36 | | 45 | 36 | | | | |
| <u> </u> | _ | 9 | | 840 | 7 | | | 103 | | 68 | 117 | 30 | 30 | 30 | 103 | 87 | 42 | 24 | | | | | | |
| | _ | 3) | | 569 | - | ~ | | 269 | | 182 | | 15 | | 56 | 9 | | | 21 | | 21 | | | 15 | |
|) [] | _ | 9) | | | 9 | | | 136 | 61 | | | | | 105 | 58 | 27 | | | | | | | | |
|) [] | _ | 3) | | | | 38 | | 56 | | | | 25 | | | | | | | | | | | | |
| Aug (| _ | 3) | | 17 | 13 | | | 27 | | 136 | | | 83 | | | | 85 | | 40 | 45 | | | | 7 |
| Aug (| _ | 9 | | | 190 | | | 5 | 16 | 32 | | 16 | 13 | 13 | 30 | 66 | 32 | | | | | | | 16 |
| Aug (| _ | 9 | | | 4 | | | 99 | | | 168 | 80 | 17 | 28 | 19 | 49 | 6 | | 13 | | | | | |
| 22-23 Aug (16) | _ | 9 | | | | 33 | | | 38 | 48 | 41 | 0 | 94 | 117 | 117 | 51 | 16 | 99 | | 22 | | | | |
| Sep (| _ | 3) | | | | | | | | | | | C | | 13 | 9 | | 13 | | 36 | | | | |
| Sep (| _ | 9) | | | | | | | | | | | | | | | 17 | | | | | | | |
| Sep (| _ | (S | | | | | | | | | | | | | | 4 | | | 33 | 14 | | | 25 | |
| | | | | | | | | | | | | | | | | | | | | | | | | |

Table 36. Length-frequency distribution of alewife larvae (sum of densities in no./1,000 m³) entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1978. Length intervals are in mm (e.g., the 5-mm interval includes all larvae from 4.1 to 5.0 mm TL). Blank entries indicate zero densities. Sample sizes are in parentheses.

| | | | - | | - | - | | | | | | | | | | | | | | | | | | | | |
|-----|-------|----------|------|----|-----|----|--------|-----|----|----|----|-----|----------------------|-----|-----|----------|------|-------|------|----------|----------------|---|-------|----------|----|----|
| | | | | | | | | | | | | Len | Length interval (mm) | int | erv | <u>a</u> | (mm) | | | | | | | | | |
| | Date | Date (N) | | 2 | 6 | 4 | ß | 9 | 7 | 8 | 6 | 5 | 10 11 12 13 14 15 | 12 | 13 | 4 | | 16 | 17 | 8 1 | 16 17 18 19 20 | | 1 2 | 21 22 23 | 24 | 25 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 21-22 | | (16) | _ | | 4 | 2 2 10 | 210 | | | 21 | | | | | | | | | | | | | | | |
| | 12-13 | | (16) | 30 | _ | 4 | ນ | | | | | | | | | | | | | | | | | | | |
| | 18-19 | | (16) | _ | | 34 | 4 | | | | | | | | | | | | | | | | | | | |
| 30 | Jun-1 | | (16) | _ | 464 | | 5 155 | | | | | | | | | | | | | | | | | | | |
| | 5-6 | | (16) | | 339 | | 0 187 | | | | | | | | | | | | | | | | | | | |
| | 19-20 | | (16) | _ | 30 | | 9 169 | 36 | | | | | | 32 | _ | 64 | 20 | | | | 13 | | | | | |
| | 25-26 | | (16) | _ | 200 | | 9 391 | | | | | | | | 22 | | , | 8 | | | | | | | | |
| | 1-2 | Aug | (16) | _ | 13 | | 80 | | | 39 | | | 15 | | | | | | 0 | <u>~</u> | 19 | | | | | |
| | 7-8 | | (15) | _ | | ñ | 80 | | 23 | | 53 | 109 | 34 | 35 | 23 | = | | • | 74 | | 17 | | | | | |
| | 14-15 | | (12) | _ | | 26 | ဖ | | | | | | | | | | | | | 18 | | | | | | |
| • | 22-23 | | (15) | | | | | | | | 44 | 38 | | | | | | 17 17 | | 34 | 4 35 | | 17 87 | 7 27 | | |
| . • | 29-31 | | (16) | | | | | | | | | | | | | | 27 | | | ı | | | , | | | |
| | 11-12 | | (16) | _ | | | | | | | | | | | | | | | | | | | | | | 45 |
| | 25-28 | | (20) | _ | | | | | | | | | | | | 15 | 28 | | | 4 | 46 13 | | 13 1 | | | 67 |
| | 9-10 | | (15) | _ | | | | | | | | | | | | | | •• | 28 2 | 28 | 68 | | | | | |
| • | 23-24 | | (12) | _ | | | | | | | | | | | | | | | | | | | 21 | 1 21 | 15 | |
| | 13-14 | | (16) | | | | | | | | | | | | | | | | | | 30 | _ | | | | |

Table 37. Length-frequency distribution of alewife larvae (sum of densities in no./1,000 m³) entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1979. Length intervals are in mm (e.g., the 5-mm interval includes all larvae from 4.1 to 5.0 mm TL). Blanks indicate zero densities. Sample sizes are in parentheses.

| | - | | | | | | | | Leng | thi | nter | Length interval (mm) | (mm | | | | | | | | | |
|-----|-----|-------|-------|-------|-----|-----|-------|-----|----------------------------|-----|------|----------------------|-------|-------|----|--------|------|----|--------|-------|--------|--------|
| 9 | 1 | 4 | S. | 9 | 7 | 80 | 6 | 5 | 11 12 13 14 15 16 17 18 19 | 12 | 13 | 4 | 15 | 16 | 17 | 18 | 1 | 20 | 21 2 | 22 23 | 3 24 | 4 25 |
| 397 | 1 | 1,929 | 490 | 23 | 85 | | | | | | | | | | | | | | | | | |
| 2 | 2 | 587 | | 15 | | | | | | | | | | | | | | | | | | |
| | | 267 | | 16 | | | | 12 | | 24 | | 19 | | | | | | | | | | |
| 0. | 9 | 2,970 | | 43 | | | | 16 | 37 | | | | 23 | | | | | | | | | |
| | 95 | 3,845 | Ń | 832 | | | | 15 | 40 | • | | | | 24 | | 24 | | | 54 | (1 | 6 | |
| | | 1,796 | 3,005 | 1,177 | 508 | 506 | 459 4 | 472 | 355 | | | 205 3 | 327 3 | 333 3 | | 301 38 | | | 588 21 | | 228 21 | |
| - | 657 | 1,446 | | 155 | | | | 225 | | 113 | 164 | | | | 89 | 79 84 | 4 42 | | 93 | | 80 | 4 |
| | 188 | 128 | | 4 | | | | 7.1 | | | | | | | | | | | | | | |
| | 12 | 82 | | 66 | | | | 4 | | | | | | 19 | | 36 | 13 | | | | | 95 28 |
| | Ξ | 4 | | | | | 7 | | | | 18 | | ω | | | | | 7 | _ | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 0 | | | | | | | | |
| | | | | | | | | | | | 27 | | | | 27 | 9 | 64 | • | | ၅ | | |
| | | | | | | | | | | | | | | | | | | ., | 33 6 | 63 | | 103 54 |
| | | | | | | | | | | | | | | | | 32 | _ | 18 | | | | |
| | | 17 | 17 | | | | | | | | | | | | | 16 | | | _ | 16 2 | 20 | 16 |
| | | | | | | | | | | | | | | | | | | | | | | 17 |
| | | | | | | | | | | | | | | | | | | | | | | |

entrained larvae in 1976, 1977, and 1979 in all length categories was indicated (Tables 33-37). In those years, upwellings appeared to be minor and of short duration (Figs. 22-26). In 1978; however, relatively frequent upwellings of cooler waters continued almost biweekly from early June to early August, occasionally resulting in temperature fluctuations from the upper teens (C) to less than 10°C. Mean June and July water temperatures were respectively 1.8C° and 3.8C° below their means for the period (1973-1979).

Diel distribution --

Alewife larvae were usually collected in significantly higher numbers during night sampling (Tables 24 and 38-47). Highest densities during all years usually occurred during either sunset-midnight (N2) or midnight-dawn (N1) diel periods. They 3,247 larvae per 1,000 m³ (midnight-dawn) on 8-9 July 1975, 1,760 larvae per 1,000 m³ (dusk-midnight) on 20-21 July 1976, 1,187 larvae per 1,000 m³ (dusk-midnight) on 21-23 June 1977, 370 larvae per 1,000 m³ (dusk-midnight) on 30 June-1 July 1978, and 1,761 larvae per 1,000 m³ (dusk-midnight) on 26-27 July 1979. For entrainment densities, the diel factor was statistically significant (ANOVA) for total larvae densities, alewife larvae densities, and occasionally egg densities (Table 23). Density (no. per 1,000 m³) ratios of day:night entrained alewife larvae were: 39:249 (1975), 62:109 (1976), 33:106 (1977), 11:32 (1978), and 28:136 (1979). Overall, during the entire period, 1975-1979 densities of alewife entrained at night were almost four times day values. In general, although more larvae were caught at night, their length-frequency distributions during day and night were similar (Fig. 32). Except for 1978, proportionately more yolk-sac alewife larvae were entrained during the day. Proportionately more larger larvae were entrained at night, a probable result of reduced intake avoidance.

Spottail Shiner

Seasonal abundance trends--

Approximately 10.5 million spottail shiner larvae were entrained during 1975-1979, making them the second-most commonly entrained species (Tables 25-30). Annual entrainment loss estimates ranged from 0.9 million in 1976 to 3.4 million in 1975. Although they were the second-most abundant species, spottails represented only 3.1% of the total projected entrainment loss for the period 1975-1979, probably because of their nearshore distribution away from the influence of the intakes.

Table 38. Length-frequency distributions (sum of densities in no./1,000 m³) by diel period for major species entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1975. Length intervals are in mm (e.g., the 5-mm interval includes all larvae from 4.1 to 5.0 mm TL). Blanks indicate zero densities. Sample sizes: 291 (total), 67 (midnight-dawn), 80 (dawn-noon), 74 (noon-dusk), 70 (dusk-midnight).

| | | | | | • | | | Leng | yth i | Length interval (mm | 'a1 | (mm) | | | | | | | | | |
|--|----------------|--------------------------------|-----------------------------------|--------------------------------------|-------------------------|-----------------|-----------------|-----------|---|---------------------|-----|--------|----------------|-------|------------|----------|----|----|-------|----------|-------|
| Species/ diel period | 2 | 3 | 4 | ນ | 9 | 7 | 80 | 9 1 | 10 | 11 12 13 14 15 | 13 | 4 | 15 | 16 17 | | 18 19 | 20 | 21 | 21 22 | 23 2 | 24 25 |
| Alewife Midnight-dawn 35 5,744 Dawn-noon 1,172 Noon-dusk 58 429 Dusk-midnight 57 1,417 | 35 58 57 | 5,744 1,172 429 1,417 | 11,176 1,665 1,427 8,176 | 5 2,517 5 593 7 451 5 2,701 | 217 12 115 237 | 70 30 324 | 76 11 105 | 69 4 11 1 | 4 t 4 t 4 t 4 t 4 t 9 t 4 t 9 t 1 t 1 t 1 t 1 t 1 t 1 t 1 t 1 t 1 | 11 | 36 | 45 | 38 26 13 | 96 96 | 99e 93e | 32 52 | 17 | 17 | 52 | 17 | |
| Spottail shiner Midnight-dawn Dawn-noon Noon-dusk Dusk-midnight | | | 17 | | 165 20 184 | 50 | | 25 | | | | | | | | | | | | | |
| Rainbow smelt Midnight-dawn Dawn-noon Noon-dusk Dusk-midnight | | 15 | 12 | 6 | 47 | ਨ | | | | 17 | | | | | | 26 | 15 | 47 | 45 | 4 | |
| Yellow perch Midnight-dawn Dawn-noon Noon-dusk Dusk-midnight | | | | 81 | 15 46 | 23 | | | | | | | | | | | | | | | |

Table 39. Length-frequency distributions (sum of densities in no./1,000 m³) by diel period for major species entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1976. Length intervals are in mm (e.g., the 5-mm interval includes all larvae from 4.1 to 5.0 mm TL). Blanks indicate zero densities. Sample sizes: 461 (total), 114 (midnight-dawn), 117 (dawn-noon), 108 (noon-dusk), 122 (dusk-midnight).

| | | | | | | | | | Le | Length interval (mm) | inte | rval | E) | | | | | | | | | | |
|--|---|-------------|------------|-------|------------|---------|--------------|----|------|----------------------|------|------|----|--------|-------------|---------|------------|-------|-----|-----|-----|----|----|
| Species/ diel period | 2 | 9 | 4 | 2 | ဖ | 7 | & | 6 | 9 | = | 12 | 13 | 4 | 15 | 16 | 17 18 | 1 1 | 19 20 | 21 | 22 | 23 | 24 | 25 |
| Alewife Midnight-dawn | | 425 | 3 192 | | 377 | 207 | 143 | | 07.0 | 5 | | | | n 1 | 7 | | | | i | Ş | | | 8 |
| Dawn-noon | | 2,665 4,412 | 4,412 | 1,257 | 202 | 83 | 61 | 30 | 58 | 77 | 9 | 130 | 69 | . ro | 9 0 0 | ָ פֿ | 2 R 5 R | 12 49 | 9 | 4 t | | ລລ | 9 |
| Noon-dusk | | 188 | 188 2, 131 | | 224 | 22 | 25 | | 27 | 16 | | | | 25 | | 38 | | 16 38 | 13 |) | | | |
| Dusk-midnight | • | 1,286 | 7,665 | | 627 | 701 | 326 | | 380 | 190 | | | | 339 | | | | | 239 | 22 | 150 | 91 | |
| O OSpottail shiner Midnight-dawn | | | 20 | 32 | | 17 | | | | | | | | | | | | | | | | | |
| Dawn-noon | | | | 92 | 33 | | | | | | | | | | | | | | | | | | |
| Noon-dusk Dusk-midnight | | | 98 | 2.10 | 139 139 | | | | | | | | | | | | | | | | | | |
| Rainbow smelt | | | | | | | | | | | | | | | | | | | | | | | |
| Midnight-dawn | | | 52 | 17 | 35 | 17 | | | | | | | | | | | | 15 | 5 | | 5 | | |
| Dawn-noon •Noon-dusk Dusk-midnight | | | 0 | 4 | 46 10 | 27 7 | 12 | | | | | | | | | | | | | | | | |
| Yellow perch Midnight-dawn Dawn-noon Noon-dusk Dusk-midnight | | | | 4 | | 13 | | | | | | | | | | | | | | | | | |

Table 40. Length-frequency distributions (sum of densities in no./1,000 m³) by diel period for major species entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1977. Length intervals are in mm (e.g., the 5-mm interval includes all larvae from 4.1 to 5.0 mm TL). Blanks indicate zero densities. Sample sizes: 432 (total), 105 (midnight-dawn), 108 (dawn-noon), 114 (noon-dusk), 105 (dusk-midnight).

| , | | | | | | | | Leng | Length interval (mm) | iterv | a) (| , mm | | | | | | | | |
|---|----------------------------|---|------------------------------|--------------------------|------------------------|--------------------------|-------------------|------------------------|---------------------------|----------------------------|---------------------------|-------------------------|------------------------|-----|-----------------|--------------------|-------------------|-----|-------|-------|
| Species/ diel period 2 | 6 | 4 | 2 | 9 | 7 | 8 | 6 | Q | = | 12 | 13 | 4 | 15 | 16 | 17 | 18 19 | 9 20 | 212 | 22 23 | 24 25 |
| Alewife Midnight-dawn Dawn-noon Noon-dusk Dusk-midnight | 424 310 312 2,309 | 424 2,633 2, 310 1,727 8 312 1,661 309 6,916 1,9 | 2,136 988 733 1,958 | 603 410 104 661 | 565 54 24 416 | 223 3 80 10 106 | 269 3 73 38 | 311 46 49 210 | 108 1 19 49 32 1 | 173 1 32 17 181 2 | 161 40 25 201 20 | 78 21 12 2 288 16 | 212 43 27 164 | 126 | 75 24 142 | 43 13 118 72 | 43 14 72 45 | | 23 | 32 |
| Spottail shiner Midnight-dawn Dawn-noon Noon-dusk Dusk-midnight | 27 | 130 | 586 54 52 1,224 | 342 37 572 | 36 34 | | | 18 | | 2 | | | | | | | | | | |
| Rainbow smelt Midnight-dawn Dawn-noon Noon-dusk Dusk-midnight | | | 91 | | | | 13 | | | | | | | | | | 46 | | 21 | 40 |
| Yellow perch Midnight-dawn Dawn-noon Noon-dusk Dusk-midnight | | 1, 188 | 593 19 23 | 38 33 | 19 88 | 23 | | 18 | | | | | | | | | | | | |

Table 41. Length-frequency distributions (sum of densities in no./1,000 m³) by diel period for major species entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1978. Length intervals are in mm (e.g., the 5-mm interval includes all larvae from 4.1 to 5.0 mm TL). Blanks indicate zero densities. Sample sizes: 469 (total), 116 (midnight-dawn), 116 (dawn-noon), 117 (noon-dusk), 120 (dusk-midnight).

| | | | | | | | | | Len | gth | = | terv | /al | Length interval (mm) | | | | | | | | | | |
|---|----|--------------------------|----------------------------|------------------------------------|-----------------------|----------|----|--------------|----------------------|-------------|----------------|------------|-----------|----------------------|----|----------|------|------|----------------------|----|----------------|--------------------------|--------------------|----------------|
| Species/ diel period | 2 | 9 | 4 | 5 | 9 | 7 | 8 | 6 | 0 | 11 12 13 14 | 12 | Ē | 4 | 1 5 | 16 | 17 18 19 | 8 | | 50 | 21 | 22 | 23 | 24 | 25 |
| Alewife Midnight-dawn Dawn-noon Noon-dusk Dusk-midnight | 30 | 111 112 131 692 | 545 547 542 3,284 | 142 105 193 752 | 37 78 344 | 36 | 72 | 35 21 21 | 17 45 22 63 | 64 | 24 11 32 | 22 2 2 6 6 | 26 1 64 1 | 20 19 13 | 35 | 45 4 | 46 5 | 53 6 | 65 68 13 13 | 17 | 59 14 14 | 61 2 30 30 72 1 | 258 51 129 2 | 93 68 28 |
| Spottail shiner Midnight-dawn Dawn-noon Noon-dusk Dusk-midnight Rainbow smelt Midnight-dawn Dawn-noon Noon-dusk Dusk-midnight | | | 20 42 11 | 234 30 13 159 16 60 | 18 13 42 | | | E | | | | • | 1. | | | | | | | | | 1 | | |
| Yellow perch Midnight-dawn Dawn-noon Noon-dusk Dusk-midnight | | 42 | 195 | 105 27 56 244 | 60 13 73 320 | 28 40 | 36 | | | | | | | | | | | | | | | | | 1 |

Table 42. Length-frequency distributions (sum of densities in no./1,000 m³) by diel period for major species entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1979. Length intervals are in mm (e.g., the 5-mm interval includes all larvae from 4.1 to 5.0 mm TL). Blanks indicate zero densities. Sample sizes: 458 (total), 113 (midnight-dawn), 114 (dawn-noon), 116 (noon-dusk), 115 (dusk-midnight).

| | | | | | | | | | | | | | | | | | - | - | | | | | |
|--|-------|------|----------------------|--------------|-------|-----------|------|------------------|-----|----------------------|---------|---------|--------|---------|----------|-----------|-----------|-----------|-----|-----------------|-----------|-----------|-----------|
| | | | | | | | | | Len | Length interval (mm) | nter | val | (mm) | | | | | | | | | | |
| Species/ diel period | 2 | ေ | 4 | 5 | 9 | 7 | 8 | 6 | 10 | 10 11 12 | 2 13 | 3 14 | 4 15 | 5 16 | 5 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| Alewife Midnicht-dawn | | 77.1 | 4.239 | 3.753 | 1.118 | 632 | 67.1 | 480 4 | | | 32 | 795 | | | 183 289 | | 293 244 | 330 | 247 | 330 247 185 231 | | 27.4 | 806 |
| Dawn-noon | | 324 | 324 1,257 5 | 586 | 370 | 78 | 19 | 200 | | | 45 | 5 19 | 9 20 | | | | | 3 | 42 | 2 | | | 9 |
| Noon-dusk 337 Dusk-midnight 113 1,189 | 113 1 | 337 | 1,747 7 5,824 2,3 | 787 2,330 | 137 | 86 386 | 145 | 50 76 412 318 | | 56 129 24 | 246 305 | 5 91 | | 4 6 260 | 25 0 174 | 42 141 | 15 274 | 18 263 | 499 | 12 323 | 43 192 | 12 176 | 24 106 |
| Spottail shiner Midnight-dawn | | | 4 | 264 | | | | 22 | | | | | | | 20 | | | | | | | | |
| Dawn-noon | | | | 14 | | | | | | | | | | | • | | | | | | | | |
| Noon-dusk | | | 13 | 123 | 58 | | | | | | | | | | | | | | | | | | |
| Dusk-midnight | | | 37 | 184 | | | 103 | | | 37 | | | | | | | | | | | | | |
| Rainbow smelt | | | | | | | | | | | | | | | | | | | | | | | |
| Midnight-dawn | | | | 27 | 27 | | 27 | | 54 | | | | | | | | | | | 2 | | | 4 |
| Dawn-noon | | | | 23 | 42 | 42 | | | 16 | | | | | | | | | | | | | | |
| Noon-dusk | | | | 134 | 17 | | | | | | | | | | | | | | | | | | |
| Dusk-midnight | | | | | 167 | 47 | | 47 | | | | | | | | | | | | | | | |
| Yellow perch | | | | | | | | | | | | | | | | | | | | | | | |
| Midnight-dawn | | | | 12 | 23 | 12 | | | | | | | | | | | | | | | | | |
| Dawn-noon | | | | | 19 | | | | | | | | | | | | | | | | | | |
| Noon-dusk | | | | 13 | 39 | 13 | | | | | | | | | | | | | | | | | |
| Dusk-midnight | | | | 35 | 279 | | | | | 23 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |

Table 43. Mean densities (no./1,000 m³) of fish larvae and fish eggs entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1975. Data are summarized over diel periods: N1 (midnight-dawn), D1 (dawn-noon), D2 (noon-dusk), N2 (dusk-midnight). Blanks indicate zero densities. See Tables 33-42 and Appendix 1 for sample sizes.

| Date | | Alev | Alewife | | Sp | Spottail | = _ | Rainbow smelt | t o | Yellow perch | | Total | rotal Jarvae | | | T 0 | Fish eggs | |
|-----------|------|------|---------|------|--------|----------|------------|------------------|------|-----------------|------|-------|-----------------|------|------------|------|--------------|---|
| | ž | 10 | D2 | N2 | N D | N1 D1 D2 | N2 | N1 D1 D2 N2 | 2 N2 | N1 D1 D2 N2 | ž | D.1 | D2 | N2 | , N | 10 | 02 | N2 |
| 22-23 Feb | | | | | | | | | | | | | | | 5 | | 3 | |
| 15-16 Apr | | | | | | | | | | | | | | | <u>n</u> a | | 7.7 | 2 5 |
| 22-23 Apr | | | | | | | | | | ത | | σ | | | π | α | 27 | 2 ∘ |
| 12-16 May | | | | | | | | 46 53 | ~ | ı | 46 |) | 89 | | , t | 200 | 491 | 67 |
| 21-22 May | | | | | | | | 9 | | | | 9 |) | | 2 | 2 | 2 | 5 |
| 27-29 May | | | | | | | | | | | |) | | | | 1005 | | |
| Jun | | 237 | 280 | | | 20 | | | | | | 244 | 350 | | | 1400 | に つつ | |
| dun, | 2 19 | 63 | 42 | | 138 | - | | | | | 430 | 06 | 9 6 | | | 2005 | 1708 | |
| Jun | 245 | 97 | | 73 | 4 | 4 5 | = | 4 | ~ | 4 | 286 | 125 | | 134 | | 1069 | 5749 | 2074 |
| 24-26 Jun | 97 | 7 | | 148 | 9 | 14 | 5 | | | 12 | 107 | 43 | | 378 | | 1924 | 110 | 1692 |
| lup | | 48 | | 42 | | 6 | | | | | • | 80 | | 533 | | 2153 | 445 | 273 |
| ٠ ح | 4800 | 62 | | 2306 | တ | | 50 | | | | 4808 | 770 | | 2910 | | 2122 |) | 185.10 |
| Ju1 | 200 | 92 | | 592 | 45 | | 181 | | | | 286 | 113 | | 808 | | 205 | | 2 |
| 21-24 Jul | 1253 | 250 | _ | 779 | 22 | | 31 | က | | 00 | 1326 | 259 | 6 | 835 | | 468 | 32 | 1397 |
| Aug | 62 | 28 | 43 | 86 | | | 0 | ღ | | | 88 | 58 | 43 | 127 | 466 | 8 | 130 | 267 |
| 4-6 Aug | | ນ | 14 | | | | | | | | | ហ | 6 | | | \$ | 6.0 | , |
| 11-14 Aug | 75 | | | 66 | | | | | 12 | | 75 | | | | | | | 4 |
| 18-21 Aug | | | | | | | | | | | | | | | | | u | 2 6 |
| 26-28 Aug | | | | | | | | 4 | 45 | | | | 4 | 45 | | | • | N |
| 2-3 Sep | | | | | | | | | | | | | |) | ď | | | |
| | | | | 22 | | | | | | | | | ď | 44 | • | | | |
| 22-23 Oct | | | | | | | | | | | α | | • | • | | | | |

Table 44. Mean densities (no./1,000 m³) of fish larvae and fish eggs entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1976. Data are summarized over diel periods: N1 (midnight-dawn), D1 (dawn-noon), D2 (noon-dusk), N2 (dusk-midnight). Blanks indicate zero densities. See Tables 33-42 and Appendix 2 for sample sizes.

ž

02

5

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2

02

5

ž

N1 D1 D2 N2

N1 D1 D2 N2

N1 D1 D2 N2

22

02

Ē

Date

Alewife 0

Total larvae

Yellow perch

Rainbow smelt

Spottail shiner

Fish eggs

| 237 | 119 | | 7 | | 29 | 17 | | 20 | 8150 | 8263 | 18980 | 10475 | 10052 | 14422 | 2684 | 9218 | 26 | 12 | | | | | | |
|-----|-----|----|----|-----|------|----------|-----|-----|------|------|-------|-------|----------|--------------|------|-------|-----|-----|----|---|-----|-----|-----|-----|
| 17 | 50 | | | | | 72 | တ | | | | | | | | | | വ | | | | | | | 7 |
| | 20 | 16 | | ល | | 23 | 9 | 9 | 4602 | 5486 | 3342 | 1253 | 8286 | 52932 | 1576 | 10744 | 21 | 98 | | | | | | |
| | 68 | | | 4 | ល | 4 | 7 | 146 | 8171 | 9996 | 3642 | 27862 | 21393 | 7176 | 9969 | 59406 | 259 | 246 | 18 | | | | | |
| | ល | | | 7 | 30 | | | | 69 | 433 | 40 | 168 | 31 | 914 | 1813 | 316 | 423 | = | | ស | | | 9 | 7 |
| | | | | | ស | <u>1</u> | = | ო | 37 | 79 | 9 | თ | 23 | 162 | 361 | 9 | 48 | 22 | | | က | | | |
| | | | | | 9 | თ | | ო | 44 | 327 | œ | 20 | 20 | 764 | 350 | 74 | 22 | 17 | ល | | | 56 | 0 | |
| | | | | | 40 | | | | 52 | 83 | | 58 | o | 310 | 1323 | 288 | 134 | 78 | 17 | 9 | 4 | 13 | | |
| | | | | | | | | | | 4 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | 7 | | | | | | | | | | |
| | | | | | 5 30 | - | | | | | | | | | | | | | | | | | | |
| | | | | | 40 | | | | | | | | | 15 | | | | | | | | | | |
| | | | | | | | | | | 7 | 7 | 17 | | 12 | 50 | = | 23 | | | | | | 9 | |
| | | | | | | | | | | 7 | | | | 1 | | ស | ဗ | 4 | | | 4 | 13 | | |
| | | | | | | | | | 25 | 385 | 33 | 97 | 23 | 905 | 1760 | 325 | 355 | | | | | | | |
| | | | | | | 7 | 9 | ღ | 37 | 75 | 9 | თ | 23 | 158 | 755 | 52 | 48 | 22 | | | | | | |
| | | | | | | | | | | | | | | | ٠. | | 22 | | ល | | | 14 | 9 | |
| | | | | | | | | | 48 | 73 | | 4 | 6 | 163 | 1292 | 274 | 125 | 75 | 17 | 9 | | တ | | |
| | _ | ą | ar | lar | br | May | Мау | | | | | | | | - | | Aug | | | | Aug | Sep | Oct | Dec |
| Jan | Feb | ŭ | 5 | > | • | | | | _ | _ | _ | - | - | - | _ | _ | - | - | • | - | - | | | |

Table 45. Mean densities (no./1,000 m³) of fish larvae and fish eggs entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1977. Data are summarized over diel periods: N1 (midnight-dawn), D1 (dawn-noon), D2 (noon-dusk), N2 (dusk-midnight). Blanks indicate zero densities. See Tables 33-42 and Appendix 3 for sample sizes.

| | | A 16 | Alewife | , an | Spottail shiner | a i 1 ler | Rainbow smelt | Yellow perch | | Total larvae | al | | | F 90 | Fish eggs | |
|-----------|-----|------|---------|------|--------------------|--------------|------------------|-----------------|-----|-----------------|----|-----|-------|--------|--------------|-------|
| Date | ž | ٥ | D2 | N2 | N1 D1 D2 | 2 N2 | N1 D1 D2 N2 | N1 D1 D2 N2 | Z | 10 | D2 | N2 | E | 10 | 02 | N2 |
| | | | | | | | | | | u | | | | | • | |
| 27-28 Apr | 80 | | | | | | 4 | | 12 | ინ | | | 164 | α Ω | 4 | 2 |
| | | | | | | | | | | | | | |) | က | |
| | | 9 | | | | | | 6 | | 9 | | თ | 387 | 134 | 431 | 1841 |
| 1-2 Jun | ល | 34 | 27 | | 14 10 | | | ស | 32 | 25 | 27 | 9 | 8 19 | 2065 | 1603 | 306 |
| | | | က | | | | | 2 3 | O | | | នួ | 1484 | 4944 | 19577 | 1575 |
| | | 21 | 20 | 33 | ល | 7 45 | | 450 11 76 | | | | 173 | 7980 | 1700 | 1342 | 6288 |
| | | 284 | 147 | 1187 | | 11 436 | 7 | 2 17 | | | | 960 | 7599 | 5044 | 878 | 23144 |
| | | 109 | 92 | 716 | 24 | 4 | | 15 | | | | 716 | 50033 | 6057 | 778 | 7503 |
| | - | 156 | 124 | 588 | 16 | T | 12 | | | | | 526 | 1478 | 381 | 410 | 2031 |
| | 569 | 157 | 33 | 401 | 171 | 4 | = | | 765 | 157 | | 429 | 10176 | 2231 | 426 | 3324 |
| | | 12 | 86 | 143 | | ਹ ਹ | | | | | | 157 | 4611 | 1042 | 3396 | 1995 |
| | | 12 | 12 | 4 | | | ស | ហ | | | | 12 | 195 | 37 | 24 | 88 |
| | | 69 | 59 | 225 | | | | | | | | 235 | 65 | 63 | 4 | 9 |
| 8-9 Aug | | 56 | | 33 | | | | | | | | 33 | | | | ' |
| | | 23 | 30 | 48 | | | | | | | | 48 | | | | |
| | | 25 | 16 | 95 | | | | | | | 9 | 901 | | | | |
| | | | | 30 | | | | | | | | 30 | | | | |
| | | | | | | | | | œ | | | 1 | | | | |
| | | | 1 | c | | | | | , | | | | | | | |

Table 46. Mean densities (no./1,000 m³) of fish larvae and fish eggs entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1978. Data are summarized over diel periods: Ni (midnight-dawn), Di (dawn-noon), D2 (noon-dusk), N2 (dusk-midnight). Blanks indicate zero densities. See Tables 33-42 and Appendix 4 for sample sizes.

| | | | Alewife | /ife | | Sr | Spottail | tati | S S | Rainbow smelt | | Yellow | 3_ | | Total | - 0 | | | Fish | ds St | |
|------------|-----|----|---------|------|-----|--------|----------|-------|-----|------------------|--------|--------|-----|--------|--------|------|----|------|------|----------|--------|
| Date | | ž | 0.1 | D2 | N2 | N 1 | D 1 D | D2 N2 | N D | D1 D2 N2 | N 1 | D1 D2 | N2 | N1 D1 | 1 D2 | 1 | N2 | ž | 10 | 02 | N2 |
| | | | | | | | | | | | | | | | | | | | | | |
| 10-11 | | | | | | | | | | • | | | | | | | | 5355 | | | |
| 24-25 | | | | | | | | | | | | | | | | | | က | 37 | 25 | |
| 6-7 | | | | | | | | | | | | | ٠ | | | | | | | | e |
| 29-30 | Mar | | | | | | | | | | | | | | ro | က | | | | |) |
| 9-10 | | | | | | | | | | က | 4 | 7 | | 4 | 7 | ၉ | | | | | |
| 21-22 | | | | | 121 | | | | | | | | თ | | | 129 | 6 | 31 | | | |
| 5-6 | | | | | | | | | | | | | | | 7 | | 80 | 276 | 5841 | 261 | 103 |
| 12-13 | | | œ | | - | | œ | | | 15 | ស | 4 | 7.1 | 8 28 | 80 | 7 12 | | | | 10197 | 49608 |
| 18-19 | | ល | | က | | | | ဗ | | 4 | 33 1 | 10 39 | | 38 2 | 7 56 | | | | _ | 1541 | 398 |
| 30 Jun-1 | | 8 | | 15 | 370 | | | | | | | | 9 | 114 | - | | | | - / | 2048 | 15498 |
| 5-6 | | | 78 | | 188 | 4 | ស | 21 | | • | | | | 57 83 | 3 38 | | | _ | | 287 | 1965 |
| 10-11 | | | | | | | | | | | | | 12 | 34 | | 12 | | | 4174 | 4177 | 20391 |
| 19-20 | | | | | 352 | 9 | | 32 | | | | | 9 | | | 3 40 | Ο, | | 2156 | | 102090 |
| 25-26 | | 80 | 85 1 | 138 | 256 | 9 | | 6 | | | | | 36 | 86 85 | | | | | 4326 | | 6089 |
| 1-2 | | | | | 9 | | | | | | 4 | | | ស | 57 | | | | 83 | 153 | 128 |
| 7-8 | | | 22 | | 42 | 38 | | | တ | | | | | 71 22 | | 1 42 | | 4455 | 1918 | 153 | |
| 14-15 | | 9 | | 6 | | | | 4 | | | | | | ဖ | 17 | | | 215 | 59 | 27 | |
| 22-23 | | 47 | 7 | 7 | 20 | | | က | | | | | | 69 | 7 1. | | | 22 | | 4 | |
| 29-31 | | | വ | | | | | | | | | | | | ស | | | | | | |
| 11-12 | | | | | Ξ | | | | | | | | | | | _ | _ | | | | |
| 25-28 | | œ | | 56 | 25 | | | | | | | | | 15 | 7 26 | | ນ | 4 | | | que- |
| 9-10 | | | 67 | | 92 | | | | | | | | | 125 80 | 0 | თ | 92 | ო | | | |
| 23-24 | | | | | 19 | | | | | | | | | | | _ | 6 | | | | |
| 13-14 | | က | | 4 | | | | | | | | | | က | • | 4 | | | | | |

Table 47. Mean densities (no./1,000 m³) of fish larvae and fish eggs entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1979. Data are summarized over diel periods: N1 (midnight-dawn), D1 (dawn-noon), D2 (noon-dusk), N2 (dusk-midnight). Blanks indicate zero densities. See Tables 33-42 and Appendix 5 for sample sizes.

| | | Ale | Alewife | | S | Spottai | ail er | 8 | Rainbow smelt | 3 | | Yellow perch | 3 c | | Total | rotal Iarvae | | | F eg | Fish eggs | |
|-----------|------|--------------|---------|------|----|----------|-----------|------|------------------|-----|---|-----------------|------|------|-------|-----------------|-------------|-------|------|--------------|----------------|
| Date | Σ | 10 | D2 | N2 | ž | N1 D1 D2 | 2 N2 | ž | N1 D1 D2 | N 2 | ž | D1 D2 | 2 N2 | ž | ā | 05 | N N S | ž | 10 | D2 | N2 |
| | | | | | | | | | | | | | | | | | | , | | | |
| 12-13 Feb | | | | | | | | | | | | | | | | | | 69 | 136 | 86 | 54 |
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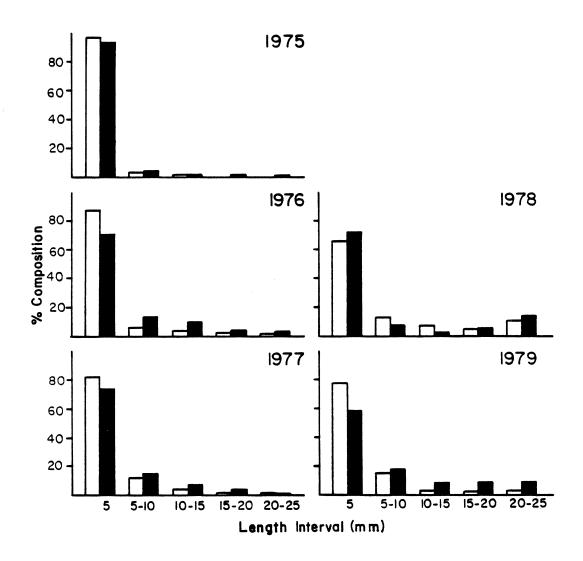


Figure 32. Length-frequency distributions for entrained alewife larvae by diel period at the D. C. Cook Plant, 1975-1979. Data are sum of densities (no. per 1,000 m³) converted to % composition.

day.

night.

Spottail shiner larvae first appeared in entrainment samples in early to mid-June (all years) and were present until late July (1977), August (1975, 1978, 1979), or even October (1976). Peak abundance of entrained spottails generally occurred in July (1975, 1976, 1978) but occurred as early as June (1977) and as late as August (1979). Greatest 24-h mean densities for 1975-1979 were: 90.2 larvae per 1,000 m³ (15-18 July), 8.0 larvae per 1,000 m³ (12-16 July), 106 larvae per 1,000 m³ (21-23 June), 10.1 larvae per 1,000 m³ (7-8 August), and 9.6 larvae per 1,000 m³ (1-2 August), respectively. Greatest individual sample densities in each year were: 354 larvae per 1,000 m³ (16 July 1975), 81 larvae per 1,000 m³ (4 August 1976), 511 larvae per 1,000 m³ (21 June 1977), 126 larvae per 1,000 m³ (19 July 1978), and 111 larvae per 1,000 m³ (6 August 1979).

Larval spottails in the 3- to 12-mm interval were collected in entrainment samples, but the larger larvae were relatively rare. The majority (73%) were < 5 mm and therefore recently hatched. Most probably drifted from inshore nurseries or were the result of spawning activity on the intake riprap. Spottail shiners were more commonly entrained at night than during the day in all years. Annual percentages of spottail larvae that were entrained during darkness were: 90, 78, 90, 84, and 82 for the years 1975-1979 respectively.

Rainbow Smelt

Seasonal abundance trends--

From 1975 to 1979, rainbow smelt accounted for 0.8% (2.7 million larvae) of total entrainment estimates (Tables 25-30). Yearly estimates ranged from 0.18 million smelt larvae in 1977 to 1.4 million in 1975. Rainbow smelt larvae were first entrained in April (1976, 1977, 1979), or May (1975, 1978) as water temperature approached 9-10°C and continued to be present in samples until July (1976, 1977) or August (1975, 1978, 1979).

Time of peak abundance of smelt larvae ranged from late April (1976) to early July (1977, 1979). The greatest mean densities over a 24-h period in each year were: $30/1,000~\text{m}^3$ (12-16 May, 1975), 18.8 larvae per 1,000 m³ (28-29 April, 1976), 2.9 larvae per 1,000 m³ (6-7 July, 1977), 3.8 larvae per 1,000 m³ (12-13 June, 1978), and 2.8 larvae per 1,000 m³ (9-10 July, 1979). Greatest individual sample densities for the years 1975-1979 were 105 larvae per 1,000 m³ (12 May), 121 larvae per 1,000 m³ (29 April), 46 larvae per 1,000 m³ (6 July), 60 larvae per 1,000 m³ (12 June), and 45 larvae per 1,000 m³ (9 July), respectively.

Like many other species of fish, smelt are most susceptible to entrainment soon after hatching (Auer 1982). Peak catches in 1975, 1976, and 1978 were composed entirely of recently hatched larvae (3-7-mm length interval). In 1977 and 1979 however, our sampling dates apparently did not correspond with peak hatching for smelt. As a result, abundance peaks were smaller, occurred later, and were made up of much larger fish. Smelt larvae \geq 19 mm represented 79% of all smelt entrained in 1977 and 73% in 1979. In 1975, 1976, and 1978 larvae \geq 20 mm accounted for only 39%, 14%, and 14%, respectively, of the total number of smelt entrained.

Newly hatched smelt larvae (≤ 6.0 mm) (Auer 1982) were found in entrainment samples over a 1-2-wk period in 1976, 1977, and 1979 and over a 4-6-wk period in 1975 and 1978. Hatchling rainbow smelt larvae were not present after the third week of June in any year, contrary to findings at the Campbell Plant (105 km north of the Cook Plant), where a second cohort, presumably spawned offshore, was recorded in samples collected in June and July (Tin and Jude 1983).

Yellow Perch

Seasonal abundance trends--

Yellow perch were the third-most abundant larval fish entrained during 1975-1979 (5 million larvae). Yearly estimated entrainment losses for yellow perch were greatest in 1977 and 1978, 1.3 million and 3.1 million larvae, respectively. Annual estimated losses for 1975, 1976, and 1979 were each less than 0.5 million (Tables 25-30).

Perch larvae were first entrained in April (1975), May (1977, 1978), or June (1976, 1979) and continued to be collected until July (1975-1977, 1979) or early August (1978). Peak abundance generally occurred in June (1977-1979) but was as early as April (1975) and as late as July (1976). Greatest mean 24-h densities in each year were: 2.2 larvae per 1,000 m³ (22-23 April 1975), 0.8 larvae per 1,000 m³ (12-16 July 1976), 134.2 larvae per 1,000 m³ (13-16 June 1977), 36.9 larvae per 1,000 m³ (18-19 June 1978), and 14.2 larvae per 1,000 m³ (20-22 June 1979). Greatest individual sample densities 1975-1979 were: 46 larvae per 1,000 m³ (13 June), 225 larvae per 1,000 m³ (12 June), and 182 larvae per 1,000 m³ (21 June) respectively.

Although larval perch collected in entrainment samples during 1975-1979 ranged in length from 3 to 11 mm, the vast majority (98%) were newly hatched (\leq 7 mm TL). Elevated susceptibility to entrainment for hatchlings, compared with

older, larger larvae, occurs for many fish species because newly hatched larvae are generally frail and planktonic (Houde 1969). Decline in entrainment rates as larvae attain greater size is likely the result of a combination of factors including increased avoidance capabilities, a possible shift in distribution away from the intakes, and natural mortality.

More perch larvae were entrained at night than during the day in all years, except for 1976. Perch larvae ability to avoid the intakes during the day and suspected increased nighttime activity probably contributed to this phenomenon. In 1975, 1978, and 1979 greatest annual mean densities occurred during dusk-midnight sampling. Midnight-dawn samples showed greatest annual mean densities of yellow perch larvae in 1977. In 1976, the years of lowest total projected entrainment for yellow perch, no perch larvae were entrained at night. Only 3 of the 14 months during 1975-1979 in which perch were entrained showed greatest mean densities occurring during daylight hours. Of those months when greatest densities occurred during night sampling, 82% showed greatest densities in the dusk-midnight sample period.

Less Abundant Species

Johnny darters--

An estimated 2.5 million johnny darter larvae were entrained during 1975-1979, accounting for 0.7% of the total projected entrainment loss (Tables 25-30). Months of capture and numbers of samples in which johnny darters were found were: August 1975 (1 sample), July 1976 (3 samples), June-July 1977 (20 samples), July-August 1978 (7 samples), and June-August 1979 (12 samples).

Greatest individual sample densities for each year were: 15 larvae per 1,000 m³ (5 August 1975), 184 larvae per 1,000 m³ (12 July 1976), 96 larvae per 1,000 m³ (7 June 1977), 73 larvae per 1,000 m³ (1 July 1978), and 148 larvae per 1,000 m³ (21 June 1979). Johnny darter larvae were most common during the month in which they first appeared. Johnny darters collected in entrainment samples ranged in length from 4.0 to 14.5 mm.

Trout-perch--

Like johnny darters, trout-perch have been entrained during all years (1975-1979), but in low numbers (Tables 25-30). Total trout-perch entrainment loss for the period 1975-1979 was 2.1 million larvae. Trout-perch larvae were first entrained in mid-June (1975, 1977, 1979), July (1976), or as late as August (1978), and were often present well into the fall: September

(1977), October (1975, 1979), or November (1976). Entrained trout-perch ranged in length from 4.5 to 19.3 mm. The number of entrainment samples in which trout-perch were present for each year (1975-1979) was 6, 6, 4, 1, and 8, respectively. Greatest individual sample densities were: 46 larvae per 1,000 m³ (22 October 1975), 17 larvae per 1,000 m³ (27 July 1976), 42 larvae per 1,000 m³ (22 August 1977), 35 larvae per 1,000 m³ (1 August 1978), and 75 larvae per 1,000 m³ (27 June 1979). Trout-perch larvae were most frequently collected during night sampling. Only 3 of the 25 samples that contained trout-perch were collected during daytime.

Common carp--

Common carp were entrained from 1976 to 1979 with an estimated total entrainment loss of 0.6 million larvae (Tables 25-30). During 1976-1979, carp larvae were found in 12 samples: 3 in 1976, 1 in 1977, 2 in 1978, and 6 in 1979. The earliest record of a common carp larva in entrainment was 6 June 1979 and the latest was 15 August 1978. Entrained carp ranged in length from 4.1 to 7.0 mm and therefore were believed to have been recently hatched. Few juveniles were ever collected, suggesting high mortality of these larvae.

Unidentified minnows--

Unidentified minnows were entrained during 1977 and 1979, contributing 0.3% of the total estimated entrainment loss (Tables 25-30). In 1977, one minnow larva was collected on 12 April. In 1979, eight samples contained these larvae; the earliest occurrence was on 21 June and the latest on 7 August. Unidentified minnows ranged in length from 4.0 to 8.0 mm.

Sculpins--

Sculpins (slimy, mottled, deepwater, and unidentified) have been entrained consistently at the Cook Plant since 1975 (Tables 25-30). One-half million mottled, 0.4 million slimy, 0.2 million deepwater, and 0.6 million unidentified sculpins were entrained from 1975 to 1979 and together, they comprised less than 0.5% of total entrainment losses over that period. Slimy sculpins were present in all years but 1979, mottled sculpins in all years but 1978, and deepwater sculpins were present in 1978 and 1979.

Mottled sculpins were collected over a 1-2-wk period during June in all years that they were entrained. The earliest record of a mottled sculpin larva in entrainment samples was 2 June 1977 and the latest was 28 June 1979. Mottled sculpin larvae ranged in length from 6.0 to 9.2 mm.

Slimy sculpins were entrained predominately during June, with the exception of one larva collected in late May 1977 and one collected in mid-July 1976. The one sculpin larva collected in July was 18.0 mm TL and all others collected in May and June varied in length from 8.0 to 9.5 mm.

Slimy sculpins and mottled sculpins are very similar in appearance as larvae, and an accurate fin-ray count is essential to separate the two species correctly. Unidentified sculpins were either slimy or mottled, but due either to their deteriorated physical condition or extremely early stage of development, they could not be identified with certainty. Deepwater sculpins were easily separated from either slimy or mottled, and therefore they were not included in the unidentified sculpin category.

Unidentified sculpins were entrained in all years (1975-1979) with a total loss of 0.6 million larvae. Nearly all unidentified sculpin larvae were entrained during June, with the exception of three larvae taken in May 1976 and one in July 1975. Unidentified sculpin larvae ranged in length from 5 to 10 mm.

Only two deepwater sculpin larvae were collected in entrainment samples during 1975-1979, one on 30 March 1978 (12.8-mm TL) and one on 7 June 1979 (7.0-mm TL).

Miscellaneous--

Several other fish species were entrained at the Cook Plant on isolated occasions. One quillback larva (9.1 mm) and one coregonid larva (8.5 mm) were collected on 28 April 1977 (Tables 25-30). One unidentified darter larva (5.0 mm) was collected on 22 June 1977 as well as one ninespine stickleback (8.5 mm) on 26 September 1978. Two burbot larvae were found in entrainment samples: one on 29 April 1976 (5.5 mm) and one on 29 March 1978 (4.3 mm).

PRODUCTION FOREGONE

Production foregone is an estimate of future biomass lost through the cropping of fish populations near the Cook Plant via entrainment of larvae and impingement of juvenile and adult fish. Production foregone estimates include not only the biomass of those individuals actually destroyed by power plant operation, but also the potential contribution of those individuals during future time intervals. Production foregone is a measure of the biomass that would have been available to the ecosystem had not the loss occurred.

Production foregone has been previously examined for Cook Plant data by Rago (1979, 1983). We will briefly summarize his methods and results. For additional detail concerning Cook Plant production foregone model assumptions, descriptions, and statistical interpretation consult Rago (1979, 1980, 1983). Basic procedures used in the production foregone estimation included:

- 1. Transformation of length-frequency histograms of impinged fish into age frequencies using an age-length key.
- 2. Estimation of the frequency of pro- and postlarvae based upon a critical length at which the larva transforms from prolarva to postlarva. This stage is directly related to yolk-sac absorption.
- 3. Estimation of the mean weight of fish in an age class by considering the length-weight relationship and distribution of lengths within an age class.
- 4. Estimation of the mean weight of pro- and postlarvae obtained by measuring specimens and averaging this value over the distribution of larval fish lengths within an age class.
- 5. Estimation of rate of growth by assuming that the change in mean weight of an age class is proportional to the mean weight.
- 6. Estimation of age-specific survival by combining literature estimates with values obtained via a modified Horst model.
- 7. Use of the estimates in 1 through 6 (above) to calculate production foregone.

Rago's model allowed the following points to be developed (they are presented in detail in his manuscripts):

- 1. Predicted lost potential for growth of various life stages entrained or impinged at the Cook Plant.
- 2. Attributed production foregone to each life stage killed.
- 3. Predicted production foregone per individual of each life stage.
- 4. Predicted production foregone by year of loss into the future.
- 5. Sensitivity coefficients for each model parameter.
- 6. Multiple linear regressions of simultaneous sensitivity analyses for survival rates in the first year of life.
- 7. Effect of reduced entrainment mortality on pro- and postlarvae.
- 8. Effect of various intake screening schemes on production foregone.
- 9. Impact (non-availability to salmonids) of forage fish production foregone results.

Production foregone estimates ranged from 15,252 kg in 1977 to 60,451 kg in 1979 (Table 48). Actual biomass losses ranged from 481 kg in 1974 to 6,588 kg in 1979. The ratio of production foregone to actual biomass lost was usually less than 10 except for 1977 (16) and 1974 (75). Overall, from 1974 to 1979, production foregone was 8.5 times as large as the actual loss of biomass. Ichthyoplankton was the primary contributor to Cook Plant production foregone estimates.

An analysis of the age-groups that would have been produced from these larvae indicates that production foregone losses during transition from postlarvae to age 0 were substantial, second only to losses by the age-0 to age-1 group (Table 48). For all years listed, the production foregone biomass loss of pro- to postlarvae was minor.

In Rago's model, entrainment mortality is assumed to be 100%. If, in fact, the actual mortality was only 75%, production foregone would be reduced annually by 20 to 25% (Table 49). Screening devices can be used to reduce production foregone. Rago (1983) evaluated two hypothetical screening devices. The first screen excluded individuals longer than 50 mm. In all

Table 48. Predicted production foregone biomass (kg) lost by various age-groups. Fish were entrained

| or imp Adapte | or impinged at the D. C. Adapted from Rago (1983) | . 1 | Cook Plant, southeastern Lake Michigan, 1974-1979. | tern Lake | Michigan | , 1974-1 | 979. | | | |
|------------------|--|--------------------------------|--|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---|
| Year | % Due to entrain- ment | Prolarvae to post larvae | Post larvae to age O | Age 0 to age 1 | Age 1 to age 2 | Age 2 to age 3 | Age 3 to age 4 | Age 4 to age 5 | Age 5 to age 6 | Total production foregone (kg) |
| 1974 | 66. | 85 | 11,228 | 12, 175 | 10,874 | 630 | 975 | 277 | 69 | 36,312 |
| 1975 | 99.1 | 32 | 11,260 | 14,609 | 8,026 | 2,942 | 1,711 | 407 | 170 | 39, 159 |
| 1976 | 98.6 | 80 | 8,712 | 10, 122 | 996'9 | 297 | 1,129 | 414 | 145 | 27,865 |
| 1977 | 98.6 | 35 | 4,568 | 5,345 | 4,354 | 193 | 549 | 110 | 48 | 15,252 |
| 1978 | 96.4 | 49 | 7,830 | 4,422 | 4,619 | 23 | 551 | 283 | 170 | 17,948 |
| 1979 | 95.5 | 235 | 17.096 | 21.686 | 18.463 | 794 | 1.471 | 499 | 207 | 60,450 |

Table 49. Effectiveness of various mitigation measures in reducing actual biomass lost and production foregone; A.B. = actual biomass. Adapted from Rago (1983).

| | s > 100 mm | % Decrease in A.B. | 85.7 | 66 | 97.3 | 90 | 6 7 6 | 89.5 |
|--------------------|--|------------------------------------|--------|---------|--------|-----------------|--------|--------|
| | Screen adults > 100 mm | % Decrease in P.F. | 0.1 | 8.0 | 0.1 | 0.4 | 9 | 0.5 |
| Mitigation measure | ts > 50 mm | % Decrease in A.B. | 6.66 | 100 | 90 | 90 | 00 | 90 |
| Mitiga | Screen adults > 50 mm | % Decrease tn P.F. | 0.1 | 6.0 | 4.4 | 1 .3 | 3.5 | 4.5 |
| | Reduce entrainment mortality by 25% | % Decrease in P.F. | 25.0 | 23.8 | 24.7 | 24.6 | 24.1 | 23.9 |
| | · | Actual biomass lost (kg) | 481 | 5,567 | 3,460 | 940 | 5,984 | 6,588 |
| | | Estimated production foregone (kg) | 36,312 | 39, 159 | 27,865 | 15,252 | 17,948 | 60,450 |
| | | Year | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 |

years this device would virtually eliminate impingement but would only have a very minor effect on production foregone. The reduction in production foregone for 1974-1979 would have ranged from 0.1% to 4.5% (mean = 2%). The second screen (excluding individuals > 100 mm) would also significantly reduce actual biomass (impingement) lost, but would have an insignificant effect on total production foregone (annual mean 1974-1979: 0.9%).

Production foregone losses do not occur over a short time period. They are distributed over the life span of a particular cohort. The temporal distribution of the production foregone losses at the Cook Plant (Table 50) showed that within 1 yr of actual entrainment and impingement loss, an average of 32% of the production foregone would have been realized. Within 2 yr about 67% and within 3 yr 94% of the average production foregone loss would have occurred.

Rago indicates that most production foregone is directly attributable to entrainment, while the actual biomass loss is primarily the result of impingement. The evaluation of potential impact of plant operation on Lake Michigan fisheries must consider both immediate and future effects. The question of which effect is more important and more relevant when effecting mitigation is difficult to resolve. Production foregone is highly uncertain, whereas actual losses are subject only to sampling error. Production foregone uncertainty increases over time as a result of assumptions of stable growth and mortality schedules for the population, increasing sensitivity and dependency of the model on estimates of key parameters (particularly first-year larvae mortality), variation in population structures, and absence of compensatory population mechanisms.

Production foregone uncertainty is probably low in the first year of estimate because compensatory processes would be unlikely to have had much effect in 1 yr. Thus, first-year production foregone estimates may be regarded as reasonably sound. As future growth and survival change, production foregone estimates would also be altered. If fish populations readily compensate for additional sources of mortality, production foregone losses would be less than those predicted by Rago's model. Compensation has been the topic of many papers and symposia (see Van Winkle 1977).

Table 50. Summary of production foregone in kg by year of predicted loss. Total biomass loss = actual biomass lost + production foregone. Adapted from Rago (1983).

| | Total biomass lost | 36,793 44,726 31,325 16,192 23,932 67,039 |
|----------------------------|----------------------------------|--|
| • | Total production foregone | 36,312 39,159 27,865 15,252 17,948 60,451 |
| | 7 | 59 60 56 27 28 80 |
| · | 9 | 267 304 300 135 113 |
| ne e | 2 | 971 1,653 1,044 530 424 1,365 |
| ion foregon into future | 4 | 630 2,926 299 197 32 828 |
| 1 11 | 3 | 10,870 8,003 6,932 4,292 4,513 17,456 |
| Product | 2 | 12,177 14,631 10,149 5,338 4,495 21,541 |
| | 1 | 11,336 11,581 9,083 4,732 8,342 18,820 |
| | Biomass actually lost (kg) | 481 5,567 3,460 940 5,984 6,588 |
| | Year | 1974 1975 1976 1977 1978 |

Screening Devices

The exclusion of fish larvae from power plant intakes by the use of screens has received considerable attention. application of these technologies may, however, have limited use at the Cook Plant. Here we briefly review the experience at the J. H. Campbell Plant where Unit 3 intakes were constructed with 9.4-mm square mesh wedge-wire screen to reduce impingement and entrainment (Schneeberger and Jude 1981, Jude et al. 1982). use of mesh screens and large screenfields necessary to accommodate the large volumes of water required for condenser cooling at relatively low intake velocities requires the development of a large area of lake substrate, including the addition of crushed limestone riprap and the intake screen At Campbell, the ratio of entrained larvae densities to field densities was substantially less than the 11 fold difference predicted by Zeitoun et al. (1981) based on smallscale lake testing. In full-scale field operation, Unit 3 entrainment densities at Campbell were roughly equal to field densities. In general, entrained larvae were smaller (< 9 mm) than field-caught larvae (2.5-25 mm). Additionally, the extensive riprap area attracted fish, most importantly, substantial numbers of yellow perch which spawn on the riprap. At the Cook Plant (without screens), entrainment: field ratios were very similar, as were larvae length groups (Perrone et al. 1984). From 1975 to 1979, 86% of entrained larvae were less than or equal to the 9-mm length exclusion limit of the Campbell screens. In 1981, the same year covered by the Campbell study, over 91% of larvae entrained at Cook were less than or equal to the 9-mm limit.

Results of the Campbell studies suggest that while the 9.5-mm, wedge-wire screen is effective in eliminating impingement and reducing the entrainment of larger larvae, it probably would not be effective in substantially reducing entrainment at the Cook Plant or the associated ecological penalties associated with production foregone forecasts. A statistical approach forwarded by Schneeberger and Jude (1981) to evaluate different screen slot sizes indicates that 2.0-mm wedge-wire screen would not significantly reduce entrainment of the more numerous smaller larvae during the summer months. Additional problems of the wedge-wire screens at Campbell include more rapid biofouling, more maintenance than projected, and attraction of fish to the riprap and screen field. Yellow perch, a gamefish and commercial species, was the dominant species entrained at Campbell's Unit 3, while at other Campbell intakes (and at Cook) alewives dominated entrainment losses. In summary, the prevention of larger larvae

from being entrained by the use of stationary screens may be overshadowed by the availability of a large riprap and screenfield in a previously featureless area of Lake Michigan as the riprap increases surface area and shelter for potential fish-food organisms and provides a spawning substrate and habitat for additional fish species. This screening type and structure, if used at Cook, would eliminate impingement and cause a minor (10-15%, if any) reduction in entrainment losses.

Intake Placement

The location of intake structures can have a substantial influence on the magnitude of entrainment losses. The placement of the Cook Plant intakes appears to have successfully balanced engineering and biological considerations, although the latter may have been more accidental than preplanned because the intakes were not specifically designed to reduce or prevent entrainment losses. Cook Plant intakes were designed primarily to withstand the harsh environment (heavy ice conditions) common to this area of Lake Michigan. Fortunately, few important gamefish use the intake area extensively nor is it a unique spawning, nursery, or feeding area. A more thorough discussion of alternative intake designs and considerations may be found in Indiana & Michigan Electric Company (IMEC) (1979).

Our examination of biological data collected in the vicinity of the Cook Plant indicates that the 7.3-m intake depth probably reduces entrainment losses when compared to its placement in shallower water. Although fish larvae field distributions are often inconsistent in relation to water depth, time of day, season, and year, general observations support the contention that alewife larvae densities decline substantially with depth and therefore distance offshore (Fig. 33). Larvae mean densities (1975-1979 means for combined samples) are maximal (1,870/1,000 m³) in the beach zone and as depth increases, density substantially decreases: $6 \text{ m} - 597/1,000 \text{ m}^3$, $9 \text{ m} - 388/1,000 \text{ m}^3$, and 21 m - 57/1,000 m³. Similarly, data collected at the J. H. Campbell Plant indicated that during most years (1977-1981) the major site of concentration of alewife larvae was primarily less than 6 m, except during years when upwellings were rare, and alewives were found to be widely distributed out to the 15-m contour. The actual distribution of larvae appears to be dependent upon upwellings which may act as regulating mechanisms at these depths (Heufelder et al. 1982, Jude et al. 1982).

Distribution of important fish-food organisms, specifically Pontoporeia hoyi and Mysis relicta, indicates a direct relationship with depth (Fig. 34). Substantial increases in density occur as depth increases (IMEC 1979). IMEC (1979)

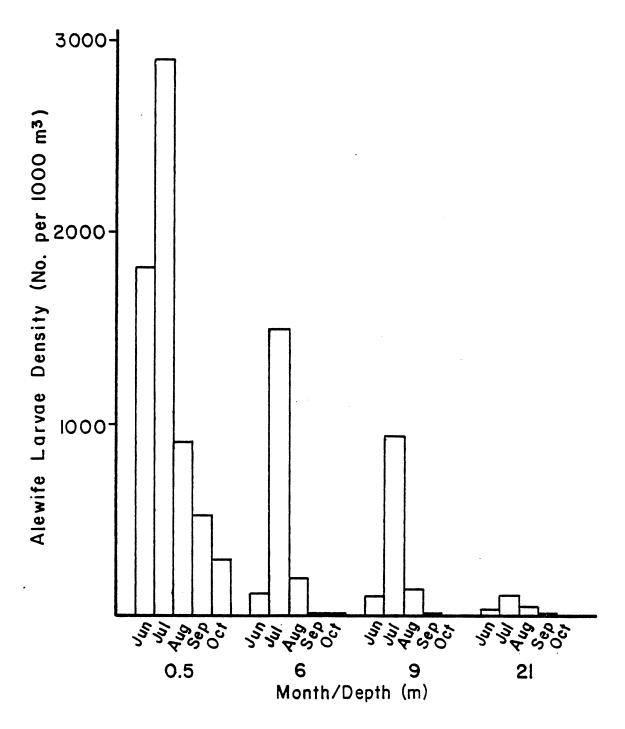
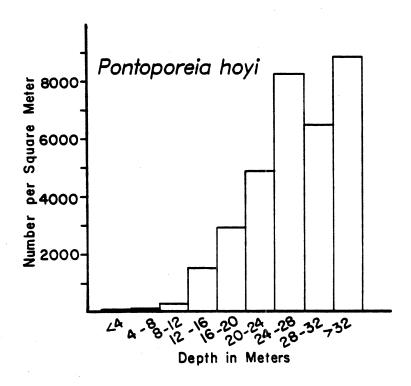


Figure 33. Depth distribution of alewife larvae in the vicinity of the D. C. Cook Plant, southeastern Lake Michigan, from June to October, 1975-1979. All samples from beach (A, B, F), 6-m (C, G, R), 9-m (D, H), and 21-m (E, W) stations were included in this analysis. See Appendixes 6-12 for sample sizes and additional sample information.



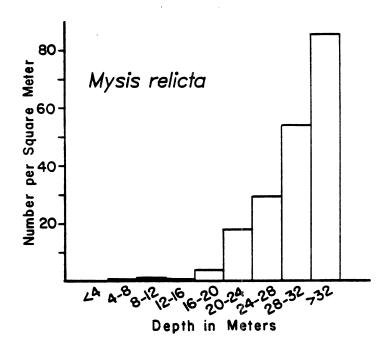


Figure 34. Depth distribution of benthic *Pontoporeia hoyi* and *Mysis relicta* in the vicinity of the D. C. Cook Plant, southeastern Lake Michigan (M. Winnell, Great Lakes Res. Div., Univ of Mich., Ann Arbor, Mich., personal communication).

estimated that moving Cook Plant intakes farther offshore would result in substantial entrainment increases for both species. Densities of Pontoporeia hoyi in intake waters (currently 0.05-0.1/m³) would increase to more than 1.0/m³ at 12 m and 1.75-3.5/m³ at 15 m. Coincidentally, Mysis relicta densities would increase approximately 10 times at 15 m and 100 times at 22 m. Therefore, relocation of the intakes at greater depths, while possibly reducing fish larvae entrainment, might impact local populations of Pontoporeia and Mysis.

Changes in Plant Operation

The circulating water system flow rates at the Cook Plant often have a direct relationship with the numbers of larvae entrained. Reductions in water volumes used for condenser cooling during specific periods (June, July, and August) of increased larval fish densities could substantially reduce entrainment losses. Reductions in plant operations, e.g., for periodic maintenance or refueling, should be (and usually are) scheduled to coincide with months of greatest larvae abundance. The refueling cycle for Unit 1 is 12 mo, Unit 2 is 18 mo. The potential for reduction in annual entrainment losses (1975-1979) approached 16 million larvae for every 5% reduction in flow during those years. These reductions in entrainment losses could have been attained by a combination of rescheduling, refueling, and maintenance, or by diel variation in the circulating water pumping schedules. These operational changes might accrue substantial cost to IMEC. IMEC (1979) evaluated the biological and economic impacts of reducing the flow rate of the circulating water system. Their analysis used a 183-day period from 1 April to 30 September. Their "thought experiment" considered the removal from service of one pump from Unit 1 and one or two pumps from Unit 2. It should be noted that, had any such "thought experiment" been conducted, it would have resulted in violation of Nuclear Regulatory Commission (NRC) environmental technical specifications calling for a Δ T not exceeding 12.10° for Unit 1 and 9.3C° for Unit 2. The results of IMEC's analysis are indicated in Table 51.

Operation at temperatures less than the inlet temperature specified (21°C) would result in reduced power generation from full load. IMEC estimated that such a schedule of plant operation would result in a loss of approximately \$833,600 (1978 dollars) with a realization that the entrainment loss reduction would be worth (in terms of the production foregone analysis available at that time) approximately \$144,600. From these analyses, IMEC concluded that such a schedule was not cost effective. A reevaluation of such an operational schedule with the time period considered reduced to 1 June - 30 August (91

Table 51. Effect of reduced circulating water flow at 21°C inlet temperature on unit Δ T, condenser backpressure, and electrical generation. The reduction from design flow rate is calculated on the basis of a maximum flow of 6,100 m³/min with all seven circulating pumps in service. The decrease in electrical output column considers a 2 Mw credit per idled pump for reduced auxiliary power requirements. Adapted from IMEC (1979).

| Decrease in electrical output (%) | Base 0.4 | Base 0.6 2.2 |
|--|----------------|-------------------------|
| | | |
| Condenser backpressure (mm HgA) | 2.35 | 1.96 2.16 2.63 |
| Δ T (C°) | 11.5 | 9.2 10.6 13.6 |
| Reduction from design flow rate (%) | Base 8.7 | Base 7.0 |
| Total circ. pump flow rate (m³/min) | 2,687 2,157 | 3,418 2,990 2,320 |
| No. of circ. water pumps in service | e 2 | 4 E C |
| Unit no. | пп | 888 |

days) is recommended. Our data indicate that in most years over 90% (usually over 95%) of the annual entrainment loss occurs over that time interval. Additionally, attention could be directed to varying pumping rates at night because most larvae (approximately 60-80%) are entrained during the night. All of these changes in plant operation would result in violations of NRC Δ T specifications. If entrainment losses at Cook are ever considered ecologically prohibitive, some flexibility of these rules, within prescribed limits, may be justified in light of our examination of entrainment data, as well as our knowledge concerning thermal plume impacts on local fish populations in the vicinity of the Cook Plant (see Tesar et al. 1984, Jude et al. 1980b).

PERSPECTIVES ON COOK PLANT ENTRAINMENT LOSSES

Almost 350 million fish larvae have been entrained at the Cook Plant since 1975. Of 16 Lake Michigan power plants sampled in 1975 (Spigarelli et al. 1981), the Cook Plant was rated first in terms of numbers of alewife larvae entrained, seventh in rainbow smelt entrainment, and second (of three reporting) in yellow perch entrainment. In most recent years the Cook Plant has contributed substantially to Lake Michigan entrainment losses (Table 52). Potentially important sport or commercial fish entrained at the Cook Plant in the 5-yr period from 1975 to 1979 were: yellow perch (5 million larvae), rainbow smelt (2.7 million larvae), and coregonids (85,000 larvae). No other major gamefish species (lake trout, other trout or salmon, centrarchids, esocids, etc.) have been found in entrainment samples.

Entrainment losses are a result of a combination of plantinduced stresses including:

- 1) mechanical stresses impact and abrasion with the internal surfaces of the system (screens, impellers, heat exchangers, jet diffusers, etc.) and system-induced forces (shear, cavitation, etc.).
- 2) thermal stress.
- 3) pressure changes supersaturation of gases, gas bubble disease, etc.
- 4) exposure to toxicants chlorine used for cleaning condenser tubes and miscellaneous effluent released into the discharge.

Table 52. Entrainment losses (estimated numbers of larvae) of alewife, rainbow smelt, and yellow perch at a number of Lake Michigan power plants. NR - not reporting.

| Power plant | Ale | ew: | ife | | | | Yellow perch |
|--|------------|-------------|---|-------------------|-------------|---|--|
| Bailly, 1975 (Texas Inst., Inc. 1976) | 4.08 | x | 107 | 3.13 | x | 105 | 1.5 x 10 |
| Zion, 1975 (Cima et al. 1976) | 1.13 | x | 10 7 | 4.33 | x | 105 | NR |
| Waukegan, 1975 (Cima et al. 1976) | 6.98 | x | 106 | 6.31 | x | 105 | NR |
| Ludington, 1978 (Liston et al. 1980) | 3.05 | x | 10° | 1.05 | x | 108 | 3.68 x 10 |
| Ludington, 1979 (Liston et al. 1981) | 3.95 | x | 10* | 1.08 | x | 10* | 4.27 x 10 |
| Campbell, 1978 (Jude et al. 1979a) | 5.1 | x | 10 7 | 1.7 | x | 10 ' | 1.8 x 10 |
| Campbell, 1979 (Jude et al. 1980a) | 2.3 | x | 107 | 1.6 | x | 10 6 | 1.5 x 10 |
| Cook Plant, 1975 1976 1977 1978 1979 | 2.7 3.1 | x x x | 10 ⁷ 10 ⁷ 10 ⁷ | 4.5 1.8 3.5 | x x x | 10 ⁵ 10 ⁵ 10 ⁵ | 1.8 x 10 3.8 x 10 1.3 x 10 3.1 x 10 3.8 x 10 |

Most of these stresses and their biological implications have been the subject of numerous symposia and reviews (Krenkel and Parker 1969; Coutant 1970; Saila 1975; Sharma et al. 1976; Van Winkle 1977; Schubel and Marcy 1978; and Jensen 1977, 1978, 1981). In most cases, the potential for damage is plant-specific and attempts to generalize condenser-passage mortality are difficult. Marcy et al. (1978) reviewed larvae mortality at 16 power plants where mortality estimates ranged from 0 to 100% and averaged 72%. Liston et al. (1981) found survival at the Ludington Pumped Storage Facility (turbine passage only) to average 11.5%.

It is becoming increasingly clear that the widespread perception that fish larvae behavior mimics that of solute particles and their movement with water masses is inadequate. These data, in this as well as other reports (Perrone et al. 1984, Jude et al. 1982, Great Lakes Res. Div. unpublished data), suggest subtle indications of selective processes that act to influence larval fish behavior and larvae entrainment. use of nearshore fish larvae abundance estimates to project entrainment levels probably does not adequately represent the potential for entrainment loss. Wallace (1978) and Heuer and Tomljanovich (1978) supported the contention that the transport of fish larvae is linked, not only to hydrodynamic conditions in the vicinity of the intakes, but also with larval fish behavior. Wallace (1978) suggested, and we concur, that utilities, when faced with expensive plant modifications (often based on poorly understood principles of larva and adult fish behavior), might be better served by developing intakes that would produce hydrodynamic conditions that would promote avoidance via visual or other sensory cues. Future work should target basic elements of behavior that could be applied to projections or models of how those behaviors are influenced by water currents and visual or other physical stimuli. Ultimately this work, along with other basic recommendations (siting studies, alteration of plant operating characteristics, etc.), may prove to be the most costeffective measures available to reduce damage to nearshore biological systems.

In summary, we have documented the entrainment loss of fish larvae and eggs at the D. C. Cook Nuclear Plant. Entrained larvae demographics as well as their temporal and spatial distribution in southeastern Lake Michigan have been examined in an attempt to determine not only "how many," but also to delineate the segment of the population most susceptible to entrainment given the intake and operating system of the Cook Plant. We have also made preliminary recommendations regarding reduction of entrainment losses that considered the relationship between impact and cost-effective mitigation efforts.

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 Effectiveness of fine mesh cylindrical wedge-wire screens in reducing entrainment of Lake Michigan ichthyoplankton.

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problems—sample not used in calculations. Grt (grate): location of forebay grate, see Fig. 3 for reference. M/S (north/south): further designation of sampling location at each grate, (1) north, (2) south, (3) no designation, see Fig. 3 for reference. Dpt (depth): depth (m) of sampling in the forebay. Dl (diel): (N1) midnight to dawn, (D1) dawn to noon, (D2) noon to dusk, (N2) dusk to midnight, (LD and LN) long day or long night, samples extending beyond normal diel schedule, (DD and DN) other day or other night, sampling was performed at irregular intervals. Temp: temperature (C) of intake water when the sample was collected. Refer Mpd (month period): consecutive number of the southeastern Lake Michigan, 1975. Sample parameter codes are: Mpd (month period): consecutive number of the sample period during the annual sample program. Ser (series): (1) standard series, (2) supplemental sample, C. Cook Plant, Densities (no./1,000 m³) for fish eggs and larvae entrained at the D. Blank entries indicate zero densities. to Table 1 for species designation. Appendix 1.

| Date Mod Ser Grt N/S Date For NS CP NS FS OL BR UC XM XC XE XX Invole For NS 22-75 1 2 3 3 5 LN 1.0 0 <t< th=""><th></th><th>Sample</th><th>parameters</th><th>ters</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>Species/groups</th><th></th><th></th></t<> | | Sample | parameters | ters | | | | | | | | | Species/groups | | |
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Appendix 1. Continued.

| | Sa | Sample | - 1 | parameter | ers | | | | | | | | Speci | Species/groups | sdno | | | | | |
|---|--------------------------|------------|-------------------|-----------|---------------------|---|---|--------------|----------------|----------|----|------|-------|----------------|-------|-------|-------|--------------------|---------------------------|--|
| Date | Mpd | Ser | Grt | N/S | Dpt | D1 | Temp | AL S | SP SM | OV TP JD | ХР | SS M | MS CP | NS FS | QL BR | UC XM | XC XE | Total XX larvae | Total arvae | Eggs |
| 4-22-75 4-23-75 4-23-75 4-23-75 4-23-75 4-23-75 | <i></i> | | თოთოთოთ | 0-0-0-0 | ឧធឧធឧធឧធ | N N N N N N N N N N N N N N N N N N N | 16.5 4.1 16.1 16.1 16.1 16.1 | | | 18 | | | · | | | | | · | 0000200 | 0 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 |
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Appendix 1. Continued.

| | Sample | 1 | parameter | ers | | | | | | | | Species/ | s/groups | | | | |
|-------------|------------|----------|----------------|----------|-----|------------|--------------------|------------|----------|----|------------|----------|----------|---------|-------------|------------------|------------------|
| Date Mp | Mpd Ser | r Grt | S/N | . Dpt | 101 | Temp | AL | SP | SM YP TP | ۵۲ | XP S | S MS CP | NS FS OL | BR UC X | XM XC XE XX | Total | Eggs |
| -79-75 | | , | - | ת | 2 | 5.5 | | | | | | | | | | С | 619 |
| -29-75 | | | - | ים כ | 2 | | | | | | | | | | | 0 | 991 |
| -29-75 | | · (* | - | · - | | | | | | | | | | | | 0 | 1090 |
| -29-75 | | m | - | . го | | | | | | | | | | | | 0 | 1121 |
| 29-75 | 10 | က | - | ၈ | Z | 15.7 | | | | | | | | | | 0 | 107 |
| 7 | • | c | c | u | | C | | | | | | | | | | c | 7 4 7 |
| -04-7 | 7 | ס פ | n (| ດເ | | 73.7 | 0 | | | | | | | | | 5 | |
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| -05-75 | _ , | י פי | N (| | | - 6 | 7007 | | | | ח כ | • | | Č | | 9 0 0 | 7777 |
| 67-60- | | ו כי | N (| | | 18.5 | 1835 | | | | 7 9 | 4 | | ۸ 4 | | 0.60 | - 44 |
| -06-75 | _ | က | 7 | - | | 17.2 | | | | | 21. | | | | | 7.7 | υ 44 Σ |
| - 10-7 | | | - | r. | | 13 | 763 | 63 | | | 63 | 63 | | | | 952 | 2489 |
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| 100 | | | - r | ט נ | | | 459 | 230 | | | | 57 | | | | 1033 | 2312 |
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| 1011 | v c | | ŋ + | ם מ | | 7 | 7 2 | 67 | | | 2 | | | | | 101 | 2703 |
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| /-11- | | | N C | סמ | | | C 4 | 77 | | | . 4 | | | | | 200 | 245 |
| / | | | ν (| n c | | | 0 2 | | | | <u>-</u> a | | | | | 0 0 | 7 + 3 C |
| 7 - 1 - 1 | | | N C | ח ת | | | 0 | | | | ט ע | | | | | 2 2 | 1346 |
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| -17-7 | | | 7 | 0 | D2 | 48 | | | | | | | | , | | 0 | 522 |
| -17-7 | ဗ | | - | വ | D2 | 18 | 65 | | 16 | | 33 | | | | | 114 | 67 |
| -17-7 | က | | က | D. | D2 | 22 | | | | | | | | | | 0 | 970 |
| -17-7 | က | | 7 | ത | ž | | İ | 40 | , | | | 26 | | | | 99 | 2462 |
| -17-7 | က | | - | 2 | ž | 18 | 16 | | 31 | | 46 | | | | | 153 | 1769 |
| -17-7 | | | e · | S. | Z : | 25 | 317 | | | | | | | | | 317 | 714 |
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| -18-7 | ကျ | | Α. | ກເ | Ξ | 9 (| 352 | 4 . 2 . | 28 | | Ļ | 6 L | | | | 4 6 6 7 | 3240 |
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Appendix 1. Continued.

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| 13 81 81 81 22 19 38 19 38 50 50 50 10 10 10 10 10 10 10 10 10 1 |
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Appendix 1. Continued.

| | Sam | ample | para | arameter | SLS | | | | | | | Species/groups | | | |
|-----------|----------------|---------------|------|----------|------|--------|-------------|----------------|----------|-------------|------|----------------------|----------------|-----------------|--|
| Date | Mpd | Ser | Grt | N/S | Dpt | 01 | Temp | AL | SP | SM YP TP JD | ΧP | SS MS CP NS FS QL BR | UC XM XC XE XX | Total larvae | Eggs |
| -01-7 | 15 | - | 6 | 9 | 5 | ž | 21.6 | | | | 45 | | | 45 | 684 |
| 7-02-75 | 15 | 7 | က | 7 | 0 | D2 | 14.2 | 12 | | | | | | 12 | 114 |
| -02-7 | 15 | - | က | - | 2 | 02 | 14.5 | | | | | | | 0 | 24 |
| -03-7 | 15 | - | е | - | വ | 0 | 17.5 | 149 | 37 | | | | | 186 | 1614 |
| -03-7 | 15 | - | 6 | က | 2 | 0 | 24.8 | 45 | | | | | | 42 | 1245 |
| NA-7 | 9 | c | C. | c | σ | | 03.0 | 2298 | 70 | | 142 | | | 25.40 | 1967 |
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| 7-08-75 | 9 4 | v - | ი ლ | v - | ט ע | 2 2 | 0.6 | 1 | <u> </u> | | 0 | | 9 | 35 | 3852 |
| -08-7 | 9 | - | σ | · (r) | , rc | | . 0 . r. | 9599 | 17 | | | | | 96.16 | 2000 |
| -60- | 16 | . 4 | n | 7 | თ | | 17.1 | 19 | 6 | | | | | 38 | 630 |
| -09-7 | 16 | - | ო | - | 2 | | 17.0 | | | | | | | 0 | 2680 |
| -09-7 | 16 | _ | 6 | ღ | 2 | | 17.0 | 123 | | | 1416 | | | 1539 | 1563 |
| -09-7 | 16 | 7 | က | 7 | တ | | 17.8 | 395 | | | 50 | | | 445 | 2186 |
| -09-7 | 16 | - | 6 | က | ស | | 18.0 | 70 | | | 4 | | | 84 | 0 |
| -09-7 | 16 | 7 | က | 7 | တ | | 17.8 | 48 | 12 | | | | | 9 | 557 |
| 60- | 16 | 7 | 6 | ო | Ŋ | Z | 18.0 | 241 | 56 | | | | | 267 | 4500 |
| -15-7 | 17 | 2 | m | ~ | - | Ž | 21.9 | 177 | 50 | | 125 | | | 350 | n n |
| -15-7 | 17 | · | m | + | . r | | 22.0 | 47 | 23 | |) | | | 200 | 235 |
| -15-7 | 17 | - | o | ო | വ | | 21.9 | | 311 | | 141 | | | 1955 | 1703 |
| - 16-7 | 17 | ~ ~ | m | 8 | - | | 22.0 | | 109 | | • | | | 194 | 37.1 |
| 7-16-75 | 17 | - | n | - | S. | Z Z | 22.1 | 48 | 48 | | 32 | | 16 | 144 | 651 |
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| -16-7 | 17 | 7 | ဗ | 7 | - | | 21.6 | 22 | | | | | | 22 | 45 |
| -16-7 | 17 | — | က | - | വ | | 21.6 | 184 | | | | | | 184 | 103 |
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Appendix 1. Continued.

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Appendix 1. Continued.

| | Sample | ple | para | parameter | srs | | | | | | | Species/groups | | |
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| -29-7 | 6 | 7 | က | က | တ | S | 23.5 | 78 | | | 26 | | 104 | 929 |
| -30-7 | 19 | 7 | က | ო | 7 | Š | 17.0 | 48 | | | | | 48 | 97 |
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| -30-7 | 19 | 7 | က | က | ស | 8 | 23.0 | 104 | | | | | 104 | 156 |
| -30-7 | | 7 | ო | ო | တ | 8 | 23.0 | 56 | | | | | 56 | 79 |
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| -31-7 | | 7 | 7 | က | ស | ž | 15.5 | 82 | | | | | 82 | 192 |
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Appendix 1. Continued.

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Appendix 1. Continued.

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Appendix 1. Continued.

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Appendix 1. Continued.

| | Sa | Sample | | parameter | ers | | | | | | | | | | Sp | ecie | pecies/groups | sdnc | | | | | |
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southeastern Lake Michigan, 1976. Sample parameter codes are: Mpd (month period): consecutive number of the sample period during the annual sample program. Ser (series): (1) standard series, (2) supplemental sample, (3) problems-sample not used in calculations. Grt (grate): location of forebay grate, see Fig. 3 for reference. N/S (north/south): further designation of sampling location at each grate, (1) north, (2) south, (3) no designation, see Fig. 3 for reference. Dpt (depth): depth (m) of sampling in the forebay. DI (diel): (NI) midnight to dawn, (DI) dawn to noon, (D2) noon to dusk, (N2) dusk to midnight. (LD and LN) long day or long night, samples extending beyond normal diel schedule, (0D and 0N) other day or other night, sampling was performed at irregular intervals. Temp: temperature (C) of intake water when the sample was collected. Refer C. Cook Plant, Densities (no./1,000 m³) for fish eggs and larvae entrained at the D. to Table 1 for species designation. Blank entries indicate zero densities. Appendix 2.

| | Eggs | | > | > C | > C | > C | > | > C | > C | O | 0 0 | 0 | , | 0 | 0 | 17 | 372 | 0 | 102 | 0 | 0 0 | O (| 0 | 163 | 193 | 0 | 108 | 30 | 67 | ; c | 15 | 5 | 5 | 7 7 | 24 | • | 0 | ٥ |
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Appendix 2. Continued.

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Appendix 2. Continued.

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Appendix 2. Continued.

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Appendix 2. Continued.

| | Sampl | a) | para | ameter | rs | | | | | | | | | Spectes | tes/groups | | | | | | |
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Appendix 2. Continued.

| | Eggs | 850 | 35578 | 18906 | 9695 | 17018 | 4221 | 3618 | 14888 | 16278 | 12099 | 8919 | 9855 | 2754 | 7489 | 4756 | 1171 | 568 | 610 | 9.70 | 18066 | 27481 | 20064 | 34239 | 2464 | 5487 | 2528 | 14424 | 40063 | 11276 | 15495 | 5595 | 2187 | 2086 | | 79535 | 71345 | 15215 | | 256206 | 34805 | 22903 | 0011 | 1150 | 236 |
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Appendix 2. Continued.

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Appendix 2. Continued.

| | Sample | le p | ar | ameter | r _s | | | | | | | | Sp. | ecie | Species/groups | sdn | | | | |
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Appendix 2. Continued.

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Appendix 2. Continued.

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Appendix 2. Continued.

| | Eggs | 00 |) C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
|----------------|-----------------|-------------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|----------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|------------|-------|-------|---------|-------|-------|------------|----------------|---------|---------|-------|
| | Total larvae | 00 | oc | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | XE XX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XM XC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Species/groups | NS F. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spec | MS CP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | X C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | Temp C | 4 .2 2.4 | | • | • | • | • | • | • | • | 3.4 | • | 3.4 | ٠ | ٠ | ٠ | ٠ | • | ٠ | • | • | • | 1.0 | 4.0 | 0. | 0. | o. - | 0. | 5. | .5 | . 5 | ب ان | ر. ت | ۲.5 |
| | 01 | D2 D2 | ž | ź | ž | Ē | 2 | 22 | 2 | Z Z | ź | ž | ž | Š | 2 | Z N | 5 | 5 | 5 | D2 | 02 | D2 | D2 | D 2 | 07 | ž | ž | ž | Š | S 2 | 2 | 5 | 5 2 | 5 |
| ers | Dpt | ខ | ល | വ | ស | ນ | ល | ល | រ បា | വ | ស | വ | ប | ល | ល | ល | വ | വ | ល | ស | ល | ល | ស | ល | ល | ល | ល | വ | ល | ល | ល | រ ល | ນ ເ | ດ |
| parameters | N/S | 00 | 8 | - | ო | က | 7 | - | ლ | က | - | - | က | - | - | ო | - | - | ო | - | - | ო | 8 | - | က | 0 | - | က | 7 | - | က | ۰ ۲ | - 0 | ۳ |
| par | Grt | 2 6 | က | က | 7 | တ | က | က | 7 | თ | က | ო | တ | က | က | တ | ო | က | თ | ო | က | ი | ო | က | 0 | က | က | 6 | က | ო | တ | ကျ | თ (| ח |
| Sample | Ser | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - |
| Sar | Mpd | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 32 | 35 | င်း |
| | Date | 12-01-76 | -01-7 | -01-7 | -01-7 | -01-7 | -02-7 | -05-7 | -02-7 | -02-7 | -15-7 | -15-7 | 12-15-76 | -16-7 | -16-7 | -16-7 | -16-7 | -16-7 | -16-7 | -16-7 | -16-7 | -16-7 | -29-7 | 29- | -29-7 | -29-7 | -29-7 | -29-7 | -30-7 | -30-7 | -30-7 | -30-7 | 7-06- | 1-06- |

(3) problems-sample not used in calculations. Grt (grate): location of forebay grate, see Fig. 3 for reference. N/S (north/south): further designation of sampling location at each grate, (1) north, (2) south, (3) no designation, see Fig. 3 for reference. Dpt (depth): depth (m) of sampling in the forebay. Dl (diel): (N1) midnight to dawn, (D1) dawn to noon, (D2) noon to dusk, (N2) dusk to midnight, (LD and LN) long day or long night, samples extending beyond normal diel schedule, (DD and DN) other day or other night, sampling was performed at irregular intervals. Temp: temperature (C) of intake water when the sample was collected. Refer Appendix 3. Densities (no./1,000 m²) for fish eggs and larvae entrained at the D. C. Cook Plant, southeastern Lake Michigan, 1977. Sample parameter codes are: Mpd (month period): consecutive number of the sample period during the annual sample program. Ser (series): (1) standard series, (2) supplemental sample, to Table 1 for species designation. Blank entries indicate zero densities.

| | Sam | Sample | par | parameters | ers | | | | | | | Species/groups | | |
|---------|----------|----------------|------|----------------|-----|--------|------------|-----|-------|---|------|---|--------------------|---------------|
| Date | Mpd | Ser | Grt | N/S | Dpt | 10 | Temp | AL | SP SM | İ | YP T | TP JD XP SS MS CP NS FS QL BR UC XM XC XE | Total XX larvae | Eggs |
| 77-70 | - | - | 6 | က | Ŋ | ž | 6.0 | | | | | | 0 | 0 |
| 11-10 | - | - | 7 | က | വ | ž | 6.0 | | | | | | 0 | 0 |
| 07-77 | - | - | ო | - | വ | ž | | | | | | | 0 | 0 |
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| 08-77 | - | - | თ | က | വ | Z | | | | | | | 0 | 0 |
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| 77-80 | - | - | က | 7 | ប | 5 | | | | | | | 0 | 0 |
| 08-77 | | - | တ | ო | ស | D2 | | | | | | | 0 | 0 |
| 08-77 | | - | 7 | ო | ស | D2 | 6.0 | | | | | | 0 | 0 |
| 08-77 | | - | က | - | ប | D2 | | | | | | | 0 | 0 |
| 08-77 | - | - | ო | 7 | ប | D2 | | | | | | | 0 | 0 |
| 29-77 | | - | ო | 7 | ស | ž | | | | | | | 0 | 0 |
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| 11-08-8 | | | ים מ | י מ | ນດ | ž | • | | | | | | o c | o c |
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| 30-77 | | - | e e | 0 | LC. | | | | | | | | c | c |
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Appendix 3. Continued.

| | Eggs | 000000000400 | 00 00 158 158 357 75 75 00 00 00 00 00 00 00 00 00 00 00 00 00 |
|----------------|-----------------|---|---|
| | Total larvae | 00000 \$ 000000 | 000000000000000000000000000000000000000 |
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| | × | | |
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| | x on | _ | |
| sd | BR | | |
| grou | s or | | 17 |
| Species/groups | NS F | | |
| Spec | CP | | |
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| parameter | N/S | 0 - 660-660-66 | 0-000-000-000-00 0-000-00-000-000-0 |
| para | Grt | | 0 |
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| Sample | Mpd | | 4444444444444 |
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Appendix 3. Continued.

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| 6 1 2 3 1 5 N 11 10.6 6 1 2 3 2 5 N 11 10.6 6 1 3 2 2 5 N 12 9.8 6 1 3 2 5 5 N 12 9.8 6 1 3 2 5 5 N 12 9.8 7 1 3 2 5 5 N 12 10.6 7 1 3 2 5 5 N 12 10.6 7 1 3 2 5 5 N 12 10.6 7 1 3 3 5 N 12 10.6 7 1 3 5 5 N 12 10.6 7 1 3 5 5 N 12 10.6 7 1 3 5 5 N 12 10.6 7 1 3 5 5 N 12 10.6 7 1 3 5 5 N 12 10.6 7 1 3 5 5 N 12 10.6 7 1 3 5 5 N 12 10.6 7 1 3 5 5 N 12 10.6 7 1 3 5 5 N 12 10.6 7 1 3 5 5 N 12 10.6 7 1 3 5 5 N 12 10.6 7 1 5 5 5 N 12 10.6 7 1 5 5 5 N 12 10.6 7 1 5 5 5 N 12 10.6 7 1 5 5 5 N 12 10.6 7 1 5 5 5 N 12 10.6 7 1 5 5 5 N 12 10.6 7 1 5 5 5 N 12 10.6 7 1 5 5 5 N 12 10.6 7 1 5 5 5 N 12 10.6 7 1 5 5 5 N 12 10.6 7 1 5 5 5 N 12 10.6 7 1 5 5 5 N 12 10.6 7 1 5 5 5 N 12 10.6 7 1 5 5 N 12 10.6 7 1 5 1 5 N 12 10.6 7 1 5 1 5 N 12 10.6 7 1 5 N 12 10.6 7 1 5 N 12 10.6 7 1 5 N 12 10.6 7 10.6 7 10.6 | 7 | - | ღ | 7 | ល | | 10.6 | | | 35 | | | | | | | | | | | 32 | 848 |
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Appendix 3. Continued.

| | Eggs | 1069 | 961 | 2694 | 1577 | 1131 | 1046 | 1563 | 2197 | 17811 | 305 | 972 | 687 | 9840 | 36101 | 59635 | 45668 | 19353 | 92315 | 58983 | 125343 | 6139 | 4854 | 6664 | 7496 | 8026 | 6804 | 8240 | 8849 | 1623 | 1054 | 2134 | 1987 | 1218 | 1695 | 1181 | 1602 | 2717 | 2000 | 2692 | 293 | 201 | 821 | 748 | 4477 | 4564 | 4848 |
|-----------|-----------------|------|---------|------|------|------|------|------|------|-------|-----|------|-----|----------|-------|-------|-------|-------|-------|-------|--------|--------------|------|------|------|------|------|------|------|------|------------|------|------------|------|------|------|------|----------|------|------|------|------|------|------|------|------|--------|
| | Total larvae | 42 | 36 | 96 | 45 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 41 | 4 | 0 | 18 | 58 | 20 | 9 | 252 | 229 | 104 | 106 | 1788 | 21 | 19 | 22 | 119 | 82 | ၁ | D C |) w | 24 | 5 | 50 | | 0 0 | t C | 5 | 0 | 18 | 17 | 21 | 09 | 28 |
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| | AL | | | | | | | | | | | | | | 9 | | | | | | 57 | 42 | 115 | | | 45 | | | | 119 | 2 | C | 000 | 34 | 14 | 12 | | 52 | 15 | - | 15 | | 18 | 17 | 4 | 30 | 42 |
| | Temp C | | 15.2 | | • | • | • | • | • | • | • | • | • | • | • | ٠ | • | • | 15.1 | 15.1 | 15.1 | • | | • | • | • | • | • | • | • | • | • | 4 4 5 0 | | | • | | • | | | • | 14.2 | • | • | ٠ | • | 15.2 |
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Appendix 3. Continued.

| | Eggs | 2217 | 78 | 88 | 495 | 751 | 524 | 20264 | 29954 | 24045 | 5508 | 8022 | 12140 | 4724 | 4604 | 10405 | 3086 | 588 | 1059 | 1740 | 14464 | 16503 | 28962 | 266 | 2274 | 3879 | 2721 | 0 7 | 937 | 7 10 | 889 | 576 | 6211 | 1 60 | 10779 | ָר ע ק | 0.00 | 78384 | 25876 | 3770 | 8934 | GO86 |
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| | Total larvae | 29 | n cc | 242 | 122 | 196 | 133 | 2139 | 1490 | 1146 | 257 | 221 | 765 | 766 | 470 | 302 | 135 | 178 | 316 | 112 | 22 69 1 | 685 | 793 | 508 | 97 | 75 | 85 | > | 144 | 171 | 28 | 158 | 72 | 188 | 865 | 244 | - or | 191 | 95 | 226 | 105 | 126 |
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Appendix 3. Continued.

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Appendix 3. Continued.

| | Sam | Sample | para | parameter | er s | | | | | | | | S | pecies/ | groups | s | | | | |
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| -80- | 17 | - | ო | - | ល | ž | _ : | 48 | | | | | | | | | | | 48 | 0 |
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| 8-08-77 | 17 | <u>-</u> | e (| - | ហ | Z : | 21.8 | 102 | | | | | | | | | | | 102 | 0 |
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Appendix 3. Continued.

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Appendix 3. Continued.

| | Sam | ample | para | amete | ers | | | | | | Species/groups | | |
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| | Date | 10-06-7 | 10-06-7 | 10-06- | 10-06- | 10-06- | 10-06-1 | 10-06- | 10-06- | | -90-01 | 10-06- | 10-06- | 10-01- | 10-01- | 10-01- | 10-01 | | | | | | | | | | | | | | 10-11-77 | | | 11-07- | 11-07- | 11-07- | 11-08- | -80-11 | 11-08- | 11-08- | | 11-08- | 11-08-11 | 11-08-1 | 11-08-7 | 1-08 |

Appendix 3. Continued.

| | Eggs | 0 | c | 0 | O | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
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| | Total larvae | 0 | c | o 0 | > | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
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sample period during the annual sample program. Ser (series): (1) standard series, (2) supplemental sample, (3) problems-sample not used in calculations. Grt (grate): location of forebay grate, see Fig. 3 for reference. N/S (north/south): further designation of sampling location at each grate, (1) north, (2) south, (3) no designation, see Fig. 3 for reference. Dpt (depth): depth (m) of sampling in the forebay. DI (diel): (NI) midnight to dawn, (DI) dawn to noon, (D2) noon to dusk, (N2) dusk to midnight, (LD and LN) long day or long night, samples extending beyond normal diel schedule, (DD and DN) other day or other night, sampling was performed at irregular intervals. Temp: temperature (C) of intake water when the sample was collected. Refer Mpd (month period): consecutive number of the Densities (no./1,000 m³) for fish eggs and larvae entrained at the D. C. Cook Plant, to Table 1 for species designation. Blank entries indicate zero densities. southeastern Lake Michigan, 1978. Sample parameter codes are: Appendix 4.

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Appendix 4. Continued.

| Species/groups Sample parameters Med Ser Grt N/S Dpt D1 Temp 178 3 1 5 1 5 1 5 1 0 0 6 178 3 1 5 1 5 1 5 1 0 0 6 178 4 1 5 1 5 1 5 1 0 0 6 178 4 1 5 1 5 1 5 1 0 0 6 178 4 1 5 1 5 1 5 1 0 0 0 6 178 4 1 5 1 5 1 5 1 0 0 0 6 178 4 1 5 1 5 1 5 1 0 0 0 0 178 4 1 5 1 5 1 5 1 0 0 0 0 178 5 1 5 1 5 1 5 1 0 0 0 0 178 6 1 5 1 5 1 5 1 0 0 0 0 178 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 | | Eggs | 000000 | 00000000000000 | 000000000000000 | 0000000 |
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Appendix 4. Continued.

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Appendix 4. Continued.

| | Sar | ample | ı | parameter | ers | | | | | | | | Species/ | es/groups | sdn | | | | | |
|---|---|---------|-------------------------|---------------------|--------------------|---|---------------------------------------|-------------------|-------|-----------|---|-------|----------|-----------|-----|---------|---------|--------------|--|--|
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Appendix 4. Continued.

| | Sam | ample | para | amete | ers | | | | | | | | | | Specie | cies/ | group | sdn | | | | | | | |
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Appendix 4. Continued.

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Appendix 4. Continued.

| | Š | amp le | e par | ameter | ters | | | | | | | | Species/groups | | | |
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Appendix 4. Continued.

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Appendix 4. Continued.

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Appendix 4. Continued.

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Refer D1 (die1): reference. N/S (north/south): further designation of sampling location at each grate, (1) north, (2) south, (3) no designation, see Fig. 3 for reference. Dpt (depth): depth (m) of sampling in the forebay. Dl (diel): (N1) midnight to dawn, (D1) dawn to noon, (D2) noon to dusk, (N2) dusk to midnight, (LD and LN) long day or long night, samples extending beyond normal diel schedule, (DD and DN) other day or other night, sampling was Mpd (month period): consecutive number of the sample period during the annual sample program. Ser (series): (1) standard series, (2) supplemental sample, (3) problems-sample not used in calculations. Grt (grate): location of forebay grate, see Fig. 3 for performed at irregular intervals. Temp: temperature (C) of intake water when the sample was collected. C. Cook Plant, Densities (no./1,000 m³) for fish eggs and larvae entrained at the D. Blank entries indicate zero densities. southeastern Lake Michigan, 1979. Sample parameter codes are: to Table 1 for species designation. Appendix 5.

| | Sal | Sample | ı | parameters | ers | | | | | | | | Species/groups | |
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Appendix 5. Continued.

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| | Total larvae Eggs | 69 17964 49 677 | | _ | | | | | | • | | | (| (1 | 4-4-(4 | () | 4- 4- 4- (A | 4440 | 4-4-(4 | (A | 4-4-W | 474 3213 957 1627 1118 2555 1231 4065 335 17493 575 19066 284 12953 368 22713 128 22713 128 2323 66 1039 0 789 178 2903 56 808 135 304 | U | 4- 4- (A | 4- 4- (A | (A | 4- 4- 4- (A | 4- 4- (A | () | 474 118 118 1335 148 156 156 178 101 101 101 101 873 888 | 474 118 118 1335 1357 128 128 108 101 101 101 101 101 101 101 101 10 | 474 118 118 1335 148 156 101 101 101 101 101 101 101 101 101 10 | 474 118 118 1231 128 1288 1288 1488 101 101 101 101 101 101 101 101 101 1 | 474 118 13335 148 156 156 178 101 101 101 135 135 135 135 140 156 135 135 135 140 156 140 156 156 156 173 173 173 173 173 173 173 173 173 173 | 474 112 1132 1132 1132 1132 1132 1132 1132 | 474 118 118 128 1335 148 156 101 101 101 101 101 101 101 101 101 10 | W | | +++4 | W | * * * * (A | 4 4 (A | 4 4 (A | 4. 4. 4. (A | 474 474 474 474 474 475 475 475 |
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| Speci | XP SS MS C | 23 | , | 30 | | 59 | | | 29 | 59 | 59 37 184 | 59 37 184 57 | | 59 37 184 57 12 | 59 37 184 12 | 59 37 184 12 | 59 37 184 57 12 | 59 37 184 57 12 | 59 37 184 57 12 | 59 37 184 57 12 | 59 37 184 57 12 | 59 37 184 57 12 | 59 37 184 57 12 | 59 184 57 12 28 | 59 184 57 12 12 28 13 | 59 37 184 57 12 13 | 59 37 184 57 12 13 | 59 37 184 57 12 13 145 | 59 37 184 57 12 28 13 | 59 37 184 57 12 13 | 59 37 184 57 12 13 | 28 13 145 145 | 28 13 12 12 13 145 16 | 59 184 57 12 13 145 16 | 184 184 17 12 13 145 16 16 33 | 184 184 17 17 18 13 145 16 16 33 30 30 | 184 184 57 12 13 13 145 16 32 33 30 | 59 12 12 13 16 16 33 33 33 33 | 59 84 12 12 14 15 16 16 33 33 37 | 59 12 12 13 16 16 16 16 13 33 30 | 59 84 12 13 14 15 13 33 33 33 37 | 59 84 12 13 14 15 16 16 16 16 16 16 16 17 | 59 12 13 14 15 16 16 16 17 18 19 19 19 19 19 19 19 19 19 19 19 19 19 | 59 84 12 12 13 14 16 16 16 16 16 16 16 16 16 16 17 18 18 18 19 19 19 19 19 19 19 19 19 19 19 19 19 | 59 84 12 12 14 16 16 16 17 17 17 18 13 13 13 13 14 16 16 16 17 18 18 18 18 19 19 19 19 19 19 19 19 19 19 19 19 19 |
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| | SP SM | | | | | | | | 45 | 4 | , P 9 4 | | - 0 4 4 | 6 | ₽ | 7 | 7 9 4 | L | L | r | L | L | r | L | L | L | L | L | L | L | r | r | L | L | L | L | L | L | L | L | L | L | L | L | L |
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Appendix 5. Continued.

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Appendix 5. Continued.

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Appendix 5. Continued.

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| - | 1-28-7 | | | ω ຕ | ო 🕶 | ע נט | | — c | ر د د | | | | | | | | | | | | | | | | | 0 0 | 0 (|
| • | 1-29-1 | | | י פ | - c | ט נו | | שפ | ٠,٠ | | | | | | | | | | | | | | | | | o c | O C |
| _ | 1-29-7 | | | 2 0 | NΘ | טוי | | , 0 | V 00 | | | | | | | | | | | | | | | | | o c | o c |
| _ | 1-29-7 | | | ι ∞ | က | ີເດ | | 1 6 | 4 | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | 1-29-7 | | | က | - | വ | | | ري ري | | | | | | | | | | | | | | | | | 0 | 0 |
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| _ | 1-29-7 | | | ω | က | ល | | | ო. | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | 1-28-7 | | | က | - | ſΩ | | | . 7 | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | 1-28-7 | | | က | 7 | ល | | | ω, | | | | | | | | | | | | | | | | | 0 | 0 |
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| - , | -10-7 | | | ი (| - (| រព | | | œ. (| | | | | | | | | | | | | | | | | 0 | 0 |
| - . 2 | -10-7 | N (| | | 0 0 | יט ר | | | 0.0 | | | | | | | | | | | | | | | | | 0 (| 0 (|
| 0: | -10- | N | | N (| | יו מ | | | <u>ب</u> | | | | | | | | | | | | | | | | | 0 (| 0 (|
| - . 1 | - 10- / | N C | | י מ | v) • | រ ព | | - c | י ת | | | | | | | | | | | | | | | | | 0 0 | 0 |
| | 2-11-7 | 10 | | י כי | - 0 | ש כ | | | | | | | | | | | | | | | | | | | | o c | O |
| - | 2-11 | 1 () | - - | 2 | 1 m | מו | Z | 10 | - c | | | | | | | | | | | | | | | | | oc |) C |
| _ | 2-11-7 | 1 (1) | | ၂ တ | က | טוי | | | | | | | | | | | | | | | | | | | | c |) C |
| - | 2-11-7 | ~ | | က | - | S. | | | . 7. | | | | | | | | | | | | | | | | | 0 | 0 |
| - | -11-7 | 0 | | က | 7 | ນ | | 4 | 5. | | | | | | | | | | | | | | | | | 0 | 0 |
| - | -11-7 | 0 | | 7 | က | ນ | | ± | 0 | | | | | | | | | | | | | | | | | 0 | 0 |
| - | -11-7 | 0 | | თ | က | വ | | 4 | . 7 | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | -11-7 | ~ | | ო | - | 5 | | 2 | - . | | | | | | | | | | | | | | | | | 0 | 0 |
| - | -11-7 | 0 | | က | 7 | ល | | 4 | 9. | | | | | | | | | | | | | | | | | 0 | 0 |
| | -11-7 | 0 | | 7 | က | IO I | | 4. | - (| | | | | | | | | | | | | | | | | 0 | 0 |
| - | -11- | | | ח | מי | Ω | | 4 | 7. | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | -19-7 | | | က | - | 5 | | 4 | 5 | | | | | | | | | | | | | | | | | 0 | 0 |
| | 12-19-79 | 30 | - | က | 8 | ນ | | 4 | 5 | | | | | | | | | | | | | | | | | 0 | 0 |
| | 2-19-7 | | | 8 | က | വ | | 4 | ت | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | 2-19-7 | | | 6 | က | IJ | | 4 | ت | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | 2-20-7 | | | က | - | ນ | | 2 | rs. | | | | | | ٠ | | | | | | | | | | | 0 | 0 |
| _ | 2-20-7 | | | က | 7 | 5 | | 2 | . تا | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | 2-20-7 | | | 7 | က | ນ | | 2 | . ت | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | 2-20-7 | | | თ | က | 5 | | 2 | ıs. | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | 2-20-7 | | | ၉ | - | S | | 4 | 5. | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | 2-20-7 | | | က | 7 | വ | | 4 | r. | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | 2-20-7 | | | 7 | က | വ | | 4 | ı, | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | 2-20-7 | | | ი | ო | വ | | 4 | r. | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | 2-19-7 | | | က | - | വ | | 2 | 0. | | | | | | | | | | | | | | | | | 0 | 0 |
| _ | 2-19-7 | | | က | 8 | ß | D2 | 4 | 0 | | | | | | | | | | | | | | | | | 0 | 0 |
| 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Appendix 5. Continued.

| | Eggs | 00 |
|-------------------|--|----------------------------|
| Species/groups | YP TP JD XP SS MS CP NS FS QL BR UC XM XC XE XX larvae | 00 |
| | YP TI | |
| | SM | |
| | SP | |
| | AL | |
| | Temp C | 0.4 |
| | | 02 02 |
| S | Dpt | വവ |
| mete | N/S | e e |
| para | Grt | 9 |
| Sample parameters | Ser | |
| San | Mpd | 3 3 |
| | Date Mpd Ser Grt N/S Dpt D1 | 12-19-79 30 12-19-79 30 |

Appendix 6. Densities (no./1,000 m 3) for fish eggs and larvae collected at beach (A, B, F) and open water (C, D, G, H, E, M) stations in Cook Plant study areas, southeastern Lake Michigan, 1973.

| Temp Date D1 Sta Dpt C AL SP SM 3-16-73 D A 0 8.0 3-16-73 D A 0 8.2 3-16-73 D B 0 8.0 3-16-73 D B 0 8.0 3-16-73 D B 0 8.0 3-16-73 D B 0 10.0 3-14-73 N B 0 10.0 3-14-73 N B 0 10.0 4-13-73 D A 0 7.5 4-13-73 D A 0 7.5 4-13-73 D B 0 8.1 4-13-73 D B 0 8.1 | ∆ } | ₽ | ס | CP BR | ss | SZ | M M 180 | Total Sc. Larvae | Eggs 0000000000000000000000000000000000 |
|--|--------|----------|---|-------|----|----|---------|------------------|---|
| -16-73 D A O 8.0 -15-73 N A O 8.2 -15-73 N A O 8.2 -16-73 D B O 8.0 -16-73 D B O 8.0 -14-73 N B O 10.0 -14-73 N B O 10.0 -13-73 D A O 7.5 -13-73 D A O 7.5 -13-73 D B O 8.1 -13-73 D B O 8.1 -13-73 D B O 8.1 | | | | | | | | 0000 000 | 0000 0000 |
| -16-73 D A O 8.0 -16-73 D A O 8.0 -15-73 N A O 8.2 -16-73 D B O 8.0 -14-73 N B O 10.0 -14-73 N B O 10.0 -13-73 D A O 7.5 -13-73 D A O 7.5 -13-73 D B O 9.7 -13-73 D B O 9.7 -13-73 D B O 9.7 -13-73 D B O 9.7 | | | | | | | | | 0000 0000 |
| -16-73 D A O 8.0 -15-73 N A O 8.2 -16-73 D B O 8.0 -14-73 N B O 10.0 -14-73 N B O 10.0 -13-73 D A O 7.5 -13-73 D A O 7.5 -13-73 D A O 7.5 -13-73 D A O 9.7 -13-73 D B O 9.7 -13-73 D B O 9.7 | | | | | | | | | 000 |
| -15-73 N A O 8.2 -16-73 N A O 8.2 -16-73 D B O 8.0 -14-73 N B O 10.0 -13-73 D A O 7.5 -13-73 D A O 7.5 -13-73 D A O 7.5 -18-73 N A O 9.7 -13-73 D B O 9.7 -13-73 D B O 8.1 | | | | | | | | | 0000 |
| -15-73 N A O 8.2 -16-73 D B O 8.0 -14-73 N B O 10.0 -14-73 N B O 10.0 -13-73 D A O 7.5 -13-73 D A O 7.5 -18-73 N A O 9.7 -18-73 N B O 8.1 -13-73 D B O 8.1 | | | | | | | | 000 | 0000 |
| -16-73 D B 0 8.0 -14-73 N B 0 10.0 -14-73 N B 0 10.0 -13-73 D A 0 7.5 -13-73 D A 0 7.5 -18-73 N A 0 9.7 -18-73 N A 0 9.7 -18-73 N B 0 8.1 -13-73 D B 0 8.1 | | | | | | | | 000 | 0000 |
| -16-73 D B 0 8.0 -14-73 N B 0 10.0 -13-73 D A 0 7.5 -13-73 D A 0 7.5 -18-73 N A 0 9.7 -18-73 N A 0 9.7 -18-73 N A 0 9.7 -18-73 D B 0 8.1 | | . • | | | | | | 00 | 000 |
| -14-73 N B 0 10.0 -14-73 N B 0 10.0 -13-73 D A 0 7.5 -13-73 D A 0 7.5 -18-73 N A 0 9.7 -13-73 D B 0 8.1 -13-73 D B 0 8.1 | | | | | | | | _ | |
| -14-73 N B 0 10.0 -13-73 D A 0 7.5 -13-73 D A 0 7.5 -18-73 N A 0 9.7 -13-73 D B 0 8.1 -13-73 D B 0 8.1 | | | | | | | | , | C |
| -13-73 D A O 7.5 -13-73 D A O 7.5 -18-73 N A O 9.7 -18-73 N A O 9.7 -13-73 D B O 8.1 -13-73 D B O 8.1 | | | | | | | | 0 | , |
| -18-73 N A O 99 -13-73 D B O 98 O 98 O 98 O 99 O 99 O 99 O 99 O | | | | | | | | C | 39484 |
| -18-73 N A O 99 -18-73 N A O 99 -18-73 N A O 99 -13-73 D B O B O B O B O D O D O D O D O D O D | | | | | | | | | |
| -18-73 N A O 99 -13-73 D B O 88 -13-73 D B O 88 | | | | | | | | | |
| -13-73 D B O 8 -13-73 D B O 8 O 8 O 8 O 8 O 8 O 8 O 8 O 8 O 8 O | | | | | | | | 0 | 3147 |
| -13-73 D B O 8 -13-73 D B O 8 | | | | | | | | • | |
| -13-73 D B O 8 | | | | | | | | 0 | 0 |
| 0 0 a N 67-01- | | | | | | | | 0 | • |
| 5 O G N 5/-61- | | | | | | | | 0 | _ |
| -19-73 N B O 9 | | | | | | | | 0 | 27.3 |
| | | | | | | | | C | |
| -13-13 1) F O G. | | | | | | | | | 0 0 |
| 4-13-73 D F O 8.8 | | | | | | | | | , , , |
| -18-/3 N F O 9. | | | | | | | | | r C |
| -18-/3 N F O G. | | | | | | | | | |
| -18-73 D A O 12 | | | | | | | | 0 | J |
| -18-73 D A O 12.5 | 0 | | | | | | | 670 | С |
| -17-73 N A O 10.7 | و | | | | | | | 286 | 573 |
| 17 | 6 286 | | | | | | | 572 | 2002 |
| -18-73 D B O 12. | | | | | | | | 0 | 5627 |
| -18-73 D B O 12. | | | | | | | | 0 | 2676(|
| 5-17-73 N B O 10.7 | | | | | | | | 0 | 0 |
| -17-73 N B O 10. | | | | | | | | 0 | 0 |

Appendix 6. Continued.

| Sample | 1 | Parameter | ers | | | | | Sp | Species/Groups | /Group | v | | | | | | |
|--|---------|-----------|------------------------------|-------------------------------|---------------------|-----|----|----|----------------|--------|----|----|-----|----|-------|--------------------------------|------------------------------------|
| Date D1 | Sta | Dpt | Temp | AL | SP | SM | ΥP | 4 | g, | d C | 8R | SS | S S | FS | Misc. | Total Larvae | Eggs |
| 5-18-73 D 5-18-73 D 5-18-73 N 5-18-73 N | | 0000 | 12.1 12.1 11.9 | | | | | | | | | | | | | 0000 | 0000 |
| 6-19-73 D 6-19-73 D 6-19-73 N 6-19-73 N | 4444 | 0000 | 23.5 23.5 22.5 22.5 | 16878 4862 2860 4004 | 286 | | | | | | | | | | | 16878 4862 2860 4290 | 0000 |
| 6-19-73 D 6-19-73 D 6-19-73 N 6-19-73 N | | 0000 | 24.5 24.5 22.0 22.0 | 1430 2860 2288 2002 | 858 1430 2574 | 286 | | | | | | | | | | 1430 3718 3718 4862 | 3147 54077 21745 98140 |
| 6-19-73 D 6-19-73 D 6-20-73 N 6-20-73 N | | 0000 | 24.0 22.0 22.0 | 4290 2574 2574 2288 | 2574 3718 | | | | | | | | | | | 4290 2574 5148 6006 | 0 0 6580 13733 |
| 7-19-73 D 7-19-73 D 7-20-73 N 7-20-73 N | 4444 | 0000 | 23.0 23.0 21.8 21.8 | 2574 6006 9724 10010 | 286 | | | | | | | | | | | 2574 6006 9724 10296 | 5436 572 90128 115021 |
| 7-19-73 D 7-19-73 D 7-20-73 N 7-20-73 N | | 0000 | 24.4 24.4 21.5 | 53208 7436 8581 6006 | 858 286 | | | | | | | | | | | 53208 7436 9439 6292 | 2288 2575 2288 |
| 7-19-73 C 7-19-73 C 7-20-73 N 7-20-73 N | 0 0 Z Z | 0000 | 25.3 25.3 25.3 25.3 | 4004 4576 13731 9441 | 572 | | | | | | | | | | | 4004 4576 13731 10013 | 3719 2002 3092990 3445207 |
| | | | | | | | | | | | | | | | | | |

Appendix 6. Continued.

| Tem Tem Tem Tem Tem Tem Tem Tem Tem Tem | Date Di Sta Dpt Temp CP SM YP TP JD CP BR SS NS FS MISC. La La C9-73 D A 0 26.0 11921 OB-73 D A 0 26.0 2706 OB-73 D B 0 26.8 3771 OB-73 D B 0 26.8 3771 OB-73 D F 0 27.0 11154 OB-73 D A 0 22.0 OB-73 D A 0 22.4 OB-73 D A 0 24.5 OB-73 D A 0 24.5 OB-73 D A 0 24.5 OB-73 D A 0 18.6 OB-73 D A 0 18.6 OB-73 D A 0 17.8 | Sample | | Parameters | ers | | | | | ऊ | Species/Groups | /Group | S | | | | | | |
|--|---|--------|----------|------------|------|---------|-----|------|----|----|----------------|--------|----|----|----|----|-------|-----------------|-------|
| D A 0 26.0 11921 N A 0 24.5 1934 N A 0 24.5 1934 N A 0 24.5 1934 N B 0 26.8 3771 N B 0 24.5 848 N B 0 24.5 848 N F 0 27.0 21166 N F 0 23.8 478 N A 0 23.4 N A 0 23.4 N B 0 23.4 N A 0 23.4 N B 0 23.4 N A 0 23.4 N B 0 24.0 N B 0 18.6 | D A 0 26.0 11921 D A 0 26.0 2706 N A 0 24.5 1062 N B 0 26.8 2603 N B 0 26.8 2603 N B 0 24.5 848 N B 0 24.5 848 N F 0 27.0 11154 D F 0 27.0 21166 N F 0 23.8 478 D A 0 22.0 N A 0 22.4 N A 0 22.4 N B 0 22.4 N B 0 22.4 N B 0 22.4 N A 0 23.4 N A 0 24.0 N B 0 22.4 N B 0 22.4 N B 0 22.4 N A 0 21.6 N A 0 21.7 N A | ate | Sta | 1 | 1 | AL | SP | NS S | γÞ | 16 | Q _D | CP | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| N A O 26.0 2706 N A O 24.5 1934 N A O 24.5 1934 N B O 24.5 1934 N B O 24.5 1934 N B O 24.5 1934 N B O 24.5 1934 N F O 27.0 21166 N A O 22.0 N A O 22.4 N A O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 24.0 N B O 24.0 N C O 24.0 N | N A 0 26.0 2706 N A 0 24.5 1934 N A 0 24.5 1934 N A 0 24.5 1934 N B 0 26.8 3771 N B 0 24.5 848 N B 0 24.5 848 N F 0 27.0 21166 N F 0 23.8 478 N A 0 22.4 N A 0 22.4 N A 0 22.4 N B 0 22.4 N A 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 24.5 N B 0 24.5 N A 0 18.6 N A 0 18.6 N A 0 18.6 N A 0 18.6 N A 0 17.8 | 1 0 | • | | 0 | 1 400 4 | | | | | | | | | | | | 11921 | C |
| N A O 24.5 1934 N A O 24.5 1934 N A O 24.5 1934 N B O 26.8 3771 N B O 24.5 848 N B O 24.5 848 N B O 22.0 11154 N F O 23.8 478 N A O 22.0 N A O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 24.5 86 N A O 25.0 N A O 25.0 N A O 25.0 N A O 25.4 N | N A O 24.5 JOSE N A O 24.5 JOSE N A O 24.5 JOSE N A O 24.5 JOSE N A O 24.5 JOSE N A O 24.5 JOSE N A O 24.5 JOSE N A O 24.5 JOSE N A O 24.5 JOSE N A O 24.5 JOSE N A O 24.5 JOSE N A O 24.5 JOSE N A O 22.0 JOSE N A O 22.0 JOSE N A O 22.4 JOSE N A O 23.4 JOSE N A O 23.4 JOSE N A O 23.4 JOSE N A O 23.4 JOSE N A O 23.4 JOSE N A O 23.4 JOSE N A O 24.0 JOSE N A O 24.2 JOSE N A O 24.2 JOSE N A O 24.2 JOSE N A O 17.8 JOS | 67-60- | ∢ • | 0 (| 76.0 | 1361 | | | | | | | | | | | | 2206 | C |
| N A 0 24 5 1062 N B 0 26 8 3771 N B 0 24 5 8 2603 N B 0 24 5 848 N B 0 24 5 848 N F 0 27 0 11154 N F 0 23 8 478 N A 0 22 0 N A 0 23 4 N B 0 22 4 N B 0 22 4 N B 0 22 4 N B 0 22 4 N B 0 23 4 N B 0 23 4 N B 0 23 4 N B 0 23 4 N B 0 24 0 N B 0 25 0 N B 0 25 0 N B 0 26 0 N B 0 27 0 N B 0 2 | N A O 24.5 1622 N B O 26.8 26.3 3771 N B O 24.5 8 2603 N B O 24.5 8 448 N F O 27.0 21164 N F O 23.8 478 N A O 22.0 N A O 23.4 N A O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N A O 17.8 N A O 17.8 | 5/-60- | ∢ < | > 0 | 24.0 | 1937 | | | | | | | | | | | | 1934 | 2213 |
| D B 0 26.8 3771 N B 0 24.5 848 N B 0 24.5 848 N F 0 27.0 11154 D F 0 27.0 21166 N F 0 23.8 1400 280 N F 0 23.4 N A 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 24.2 N B 0 24.2 N B 0 24.2 N B 0 24.2 N C 0 24.2 N C 0 24.2 N C 0 24.2 N C 0 24.2 N C 0 24.2 N C 0 24.2 N C 0 24.2 | D B 0 26.8 3771 N B 0 24.5 848 N B 0 24.5 848 N B 0 27.0 11154 D F 0 27.0 11154 N F 0 23.8 1400 280 N F 0 22.0 N A 0 23.4 N A 0 23.4 N B 0 22.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 24.0 286 N F 0 24.0 286 N F 0 24.0 286 N F 0 24.0 286 N F 0 24.0 286 N F 0 24.2 286 N F 0 24.2 286 N F 0 24.2 286 N F 0 24.2 286 N F 0 24.2 286 N F 0 24.2 286 N F 0 24.2 286 N F 0 24.2 286 | -08-73 | < < | 0 | 24.5 | 1062 | • | | | | | | | | | | | 1062 | 0 |
| N B 0 24 5 848 1154 1154 1154 1154 1154 1154 1166 120 | N B 0 24.5 848 N B 0 24.5 848 N B 0 24.5 848 N F 0 27.0 21166 N F 0 23.8 1400 280 N F 0 22.4 N A 0 22.4 N B 0 22.4 N B 0 22.4 N B 0 23.4 N B 0 24.2 N B 0 24.2 N F 0 24.2 N F 0 24.2 N F 0 24.2 | -00-73 | α | c | ď | 3774 | | | | | | | | | | | | 3771 | 314 |
| N B 0 24.5 848 N B 0 24.5 848 N F 0 27.0 11154 N F 0 23.8 478 N F 0 23.4 478 N A 0 22.4 N B 0 22.4 N B 0 23.4 N B 0 24.2 N B 0 24.2 N B 0 24.2 N B 0 24.2 | N B 0 24 5 848 8 | -09-73 | 2 | 0 | ၁ ဖ | 2603 | | | | | | | | | | | | 2603 | 0 |
| N B 0 24.5 848 N F 0 27.0 11154 N F 0 23.8 1400 280 N F 0 23.8 478 N A 0 22.0 N A 0 22.4 N B 0 22.4 N B 0 23.4 N B 0 24.2 N B 0 24.2 N F 0 24.2 N F 0 24.2 N F 0 24.2 N F 0 24.2 | N B 0 24.5 848 N F 0 27.0 11154 N F 0 27.0 21166 N F 0 27.0 21164 N F 0 23.8 478 N A 0 22.0 N A 0 23.4 N B 0 22.4 N B 0 23.4 N B 0 24.2 N B 0 24.2 N B 0 24.2 N B 0 24.2 N B 0 24.2 N B 0 24.2 N B 0 24.2 N B 0 24.2 | -08-73 | 2 | 0 | 4 | ! ! | | | | | | | | | | | | 0 | 1246 |
| D F 0 27.0 11154 N F 0 23.8 1400 280 N F 0 23.8 478 221 N N A 0 22.0 N N A 0 23.4 N N A 0 23.4 N N B 0 23.4 | D F 0 27.0 11154 N F 0 23.8 1400 280 N F 0 23.8 478 280 N A 0 22.0 N A 0 23.4 N A 0 22.4 N B 0 23.4 N B 0 2 | -08-73 | 8 | 0 | 4 | 848 | | | | | | | | | | | | 848 | 0 |
| D F 0 27.0 21166 N F 0 23.8 1400 280 N F 0 23.8 478 D A 0 22.0 N A 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 24.0 D F 0 21.6 N F 0 24.2 D A 0 18.6 N A 0 18.6 N A 0 18.6 | D F 0 27.0 21166 N F 0 23.8 1400 280 N F 0 23.8 478 N A 0 22.0 N A 0 23.4 N B 0 24.2 N B 0 24.2 N F 0 24.0 N F 0 24.2 N F 0 24.2 N F 0 24.0 N F 0 24.2 | -09-73 | ш | 0 | 27.0 | _ | | | | | | | | | | | | 11154 | 572 |
| N F 0 23.8 1400 280 N F 0 23.8 478 478 D A 0 22.0 N A 0 23.4 N A 0 23.4 N B 0 22.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 24.0 D F 0 21.6 N F 0 24.0 D F 0 24.2 N F 0 24.2 N F 0 24.2 N F 0 24.2 N F 0 24.2 | N F 0 23.8 1400 280 | -09-73 | <u> </u> | 0 | 27.0 | _ | | | | | | | | | | | | 21166 | 286 |
| N F O 23.8 478 N A O 22.0 N A O 22.0 N A O 23.4 N B O 22.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 24.6 N F O 24.6 N F O 24.6 N F O 24.6 N F O 24.8 N F O 24.8 N F O 24.2 N F O 24.2 | N F O 23.8 N A A O 22.0 N A A O 22.0 N B B O 22.4 N B B O 22.4 N B B O 22.4 N B B O 22.4 N B B O 22.4 N B B O 22.4 N B B O 22.4 N B B O 23.4 N B O 24.0 N B O 24.0 N B O 24.0 N B O 24.0 N C C C C C C C C C C C C C C C C C C | -09-73 | <u>.</u> | 0 | 23.8 | | 280 | | | | | | • | | | | | 1680 | 260 |
| D A O 22.0 N A O 23.4 N A O 23.4 N B O 22.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 24.0 D F O 24.0 D A O 18.6 N A O 18.6 N A O 18.6 | D A O C C C C C C C C C C C C C C C C C C | -09-73 | ш. | 0 | 23.8 | 478 | | | | | | | | | | | | 478 | 239 |
| D A 0 22.0 N A 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N F 0 24.0 D A 0 18.6 N A 0 18.6 N A 0 18.6 N A 0 18.6 | N A A O 222.0 N B B N O 23.4 N B B O 222.4 N N F O 23.4 N N F O 24.0 N A A O 24.0 N A O 24.0 | -07-73 | 4 | C | 0 | | | | | | | | | | | | | 0 | 0 |
| N A 0 23.4 N A 0 23.4 N B 0 22.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N B 0 24.0 N F 0 24.0 N F 0 24.2 N F 0 24.2 N F 0 24.2 N F 0 24.2 N F 0 24.2 N F 0 24.2 | N A N O 23.4 N A N O 23.4 N B B O 22.4 N B B O 22.4 N B C 23.4 N B C 23.4 N C C C C C C C C C C C C C C C C C C C | -07-73 | < ⊲ | c | 10 | | | | | | | - | | | | | | 0 | 0 |
| N A O 23.4 D B O 22.4 N B O 22.4 N B O 23.4 N B O 23.4 N B O 23.4 N B O 24.0 D F O 24.0 N F O 24.0 N F O 24.2 D A O 18.6 N A O 17.8 | N A O 23.4 D B B O 22.4 N B B O 22.4 N B C 23.4 N B C 24.0 N F C 24.0 N N F O 24.0 N N A O 17.8 N A O 17.8 | -07-73 | < ≺ | 0 | (C) | | | | | | | | | | | | | 0 | 0 |
| D B 0 22.4 N B 0 23.4 N B 0 23.4 N B 0 23.4 N F 0 21.6 N F 0 24.0 N F 0 24.2 D A 0 18.6 N A 0 17.8 | D B 0 22.4 N B 0 22.4 N B 0 23.4 N B 0 23.4 N F 0 21.6 N F 0 24.0 N F 0 24.2 N A 0 18.6 N A 0 17.8 | -07-73 | < | 0 | (7) | | | | | | | | | | | | | 0 | 5150 |
| N B 0 22.4 N B 0 23.4 N B 0 23.4 N F 0 24.0 N F 0 24.2 N F 0 24.2 N F 0 24.2 N F 0 18.6 N N D A 0 18.6 N N D A 0 18.6 N N D A 0 18.6 N N D A 0 17.8 | N B 0 22.4 N B 0 23.4 N F 0 24.6 N F 0 24.0 N A D 18.6 N A D 18.6 N A D 17.8 | -07-73 | α | c | C | | | | | | | ٠. | | | | | | 0 | 286 |
| N B 0 23.4 N B 0 23.4 N B 0 23.4 N F 0 24.0 N F 0 24.2 D A 0 18.6 N A 0 17.8 | N B 0 23.4 D F 0 21.6 N F 0 24.0 N F 0 24.0 N A 0 18.6 N A 0 17.8 | -07-73 | 0 00 | C | 10 | | | | | | | | | | | | | 0 | 286 |
| N B O 23.4 D F O 21.6 N F O 24.0 N F O 24.2 D A O 18.6 N A O 17.8 | N B 0 23.4 D F 0 21.6 N F 0 24.0 N F 0 24.2 N A 0 18.6 N A 0 17.8 | -06-73 | <u> </u> | 0 | (C) | | | | | | | | | | | | | 0 | 0 |
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| D F 0 21.6 N F 0 24.0 286 N F 0 24.2 N F 0 18.6 N A 0 18.6 N A 0 17.8 | N F 0 24.0 N F 0 24.0 N A 0 18.6 N A 0 17.8 | -07-73 | ш | С | - | | | | | | | | | | | | | 0 | 0 |
| N F O 24.0 286 N F O 24.2 N F O 18.6 N A O 18.6 N A O 17.8 | N F 0 24.0 N F 0 24.2 D A 0 18.6 N A 0 17.8 | -07-73 | . ш | 0 | - | | | | | | | | | | | | | 0 | 0 |
| N F O 24.2 D A O 18.6 N A O 17.8 | N F 0 24.2 D A 0 18.6 N A 0 17.8 | -06-73 | ш. | C | 4 | 286 | | | | | | | | | | | | 286 | 0 |
| 1 D A O 18.6 1 D A O 18.6 N A O 17.8 | B D A 0 18. B D A 0 18. N A 0 17. | -06-73 | ш. | 0 | 4 | } | | | | | | | | | | | | 0 | 12017 |
| N A O 17.8 | N A 0 17. | _ | • | C | | | | | | | | | | | | | | 0 | 0 |
| N A O 47.8 | N A 0 17. | _ | ۷ | C | | | | | | | | | | | | | | 0 | 0 |
| N A O 47 B | 1 N A O 17. | | < ∢ | 0 | | | | | | | | | | | | | | 0 | 0 |
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Appendix 6. Continued.

| Temp C C C C C C C C C C C C C C C C C C C | AL SP | ₩ | 4 H | g, | d D | SS S | SO Z | S S | M 18C. | Total Larvae 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Egg s |
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| 2 7. | | 122 | | | | | | | | 122 | 0 |
| 4 7. | | 207 | | | | | | | | 207 | 0 |

Appendix 6. Continued.

| 14-26-73 D G O D G S M S F S M S F S M S Total Eggs 4-26-73 D G 1 7.2 1 7.2 1 7.2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Sample F | Parameter | nete | S | | | | | Is | Species/Groups | /Group | S | | | | | | |
|--|--|--------------|----------|------|----|----|---------------------------|----|------------|----------------|--------|----|----|----|----|-------|---|---------|
| 26-73 D G 7.2 26-73 D G 7.2 26-73 D G 7.2 28-73 N G 7.2 28-73 N G 7.7 28-73 N G 7.7 28-73 N G 7.7 28-73 N G 7.7 28-73 N G 7.7 28-73 N H 7 7.4 28-73 N H 7 7.4 28-73 N H 7 7.4 28-73 N H 7 7.4 28-73 N H 7 7.4 28-73 N H 7 7.4 28-73 N H 7 7.4 28-73 N H 7 7.4 31 28-73 N H 7 7.4 31 32-82-73 N H 7 7.0 3 | e 01 | | ایدا | Temp | AL | SP | W.S | ٩× | d T | ۵۲ | CP | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| 26-73 D G A 7 F 65 | -26-73 -26-73 -26-73 | 0 0 0 | 0-0 | | | | | | | | | | | | | | 000 | 000 |
| 256-73 D H O 7.4 226-73 D H 1 7.4 226-73 D H 2 1 7.4 226-73 D H 2 1 7.4 226-73 D H 2 2 7.4 228-73 N H 7 1.3 228-73 N H 7 1.3 28-73 N H 7 1. | -26-73 -28-73 -28-73 -28-73 -28-73 | 000000 | 440-66 | | | • | 332 856 1398 524 | 56 | | | | | | | × | | 332 909 1398 580 | 00000 |
| -15-73 D C 0 11.8 54 -15-73 D C 1 11.8 54 -15-73 D C 2 11.8 54 -15-73 N C 2 10.7 -15-73 N C 2 10.7 -15-73 N C 2 10.7 -15-73 D D 0 11.3 -15-73 D D 0 11.3 -15-73 D D 0 11.3 -15-73 N D 0 2 11.3 -15-73 N D 0 2 10.3 -15-73 N D 0 0 10.3 -15-73 N D 0 0 10.3 -15-73 N D 0 0 10.3 -15-73 N D 0 0 10.3 -15-73 N D 0 0 10.3 -15-73 N D 0 0 10.3 -15-73 N D 0 0 10.3 -15-73 N D 0 0 10.3 -15-73 N D 0 0 10.3 | -26-73 -26-73 -26-73 -26-73 -28-73 -28-73 -28-73 | IIIIIIII | 0-040-04 | | | | 294 174 91 | | | | | | | | | | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 0000000 |
| -15-73 D D O 11.3 -15-73 D D O 11.3 -15-73 D D 2 11.3 -15-73 D D 2 11.3 -15-73 N D O 10.3 -15-73 N D O 10.3 -15-73 N D O 10.3 -15-73 N D 1 10.3 -15-73 N D 2 10.3 -15-73 N D 2 10.3 | - 15-73 - 15-73 - 15-73 - 15-73 - 15-73 - 15-73 | 00000000 | | | | | 54 | | | | | · | | | | | 0 4 0 0 0 0 0 0 | 0000000 |
| | 15-73 - 15-73 - 15-73 - 15-73 - 15-73 - 15-73 | 0000000 | | | | | 85 | | | | | | | | | | 0000 80000 | 0000000 |

Appendix 6. Continued.

| Sample | ole . | Para | Paramete | ers | | | | | Sp | Species/Groups | Group | S | | | | | | |
|-----------|------------|-------------|----------|------------|--------|-----|----|-----|-----|----------------|-------|----|----|----|----|-------|-------------|------|
| Date | ΙQ | Sta | 0p t | Temp C | AL | SP | SM | γP | 1.0 | ۵۲ | CP | BR | SS | NS | FS | Misc. | Total | Eggs |
| 46.7 | 6 | C | c | | | | | | | | - | | | | | | | |
| 5-15-73 | ے د | 5 (2 | > • | ю ф 2 С | | | | | | | | | | | | | 0 | 0 |
| - T | 2 د | 5 (| - ر | | | | | | | | | | | | | | 0 | 0 |
| 1 - 0 - 1 | ם מ | 5 (| 7 (| S c | | | | | | | | | | | | | 0 | 0 |
| 7-61- | - : | ه و | n (| S | | | | | | | | | | | | | 0 | 0 |
| 7-61- | Z | 5 | 0 | o. | | | | | | | | | | | | | 0 | 0 |
| -15-7 | Z | g , | - | · · | | | | | | | | | | | | | 0 | 0 |
| -15-7 | Z | G | 7 | Ö | | | | | | | | | | | | | 0 | 0 |
| -15-7 | Z | ပ | က | ö | | | | | | | | | | | | | 0 | 0 |
| - 15-7 | _ | 3 | c | | | | | | | | | | | | | | • | |
| 7 2 4 | 2 د | : : | ٠ د | | | | | | | | | | | | | | 0 | 0 |
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| -15-7 | Z | I | 7 | | | | | | | | | | | | | | 0 | 0 |
| -15-7 | z | I | 4 | | | | | | | | | | | | | | 0 | 0 |
| 145.7 | 6 | 2 | c | | | | | | | | | | | | | | | |
| | ء د | Ε: | ٠ د | | | | | | | | | | | | | | 0 | 0 |
| 5-15-73 | ۵ د | ΕΞ | - c | 4. | | | | | | | | | | | | | 0 | 0 |
| - 45-7 | 2 د | Ξ 3 | ١ ٥ | | | | | | | | | | | | | | 0 | 0 |
| / - 61 - | 2 | Ε | 2) | _ | | | | | | | | | | | | | 0 | 0 |
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| 6-19-73 | ٥ | ပ | - | 21.0 | 11371 | | | | | | | | | | | | 11371 | > < |
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| -19-7 | z | ပ | 7 | | œ | 188 | | | | | | | | | | | 5013 | o a |
| -19-7 | z | ပ | က | | ဘ | 187 | | 187 | | | | | | | | | 7347 | 0 |
| | | | | | | | | | | | | | | | | | 5 | > |
| 19 | ۵ | ۵ | 0 | | 643 | | | | | | | | | | | | 643 | 0 |
| - 19-7 | ٥ | ٥ | - | Ť. | 4 | | | 291 | | | | | | | | | 7780 | 194 |
| -19-7 | ۵ | ٥ | 7 | ÷ | 2050 | | | 246 | | | | | | | | | 2296 |) |
| -19-7 | ٥ | ٥ | 4 | ω. | 260 | | | | | | | | | | | | 260 | C |
| -19-7 | z | ٥ | 0 | _ | - | | | | | | | | | | | | 2181 | 128 |
| -19-7 | z | ٥ | - | _ | 1335 | | | 89 | | | | | | | | | 1403 | 9 |
| -19-7 | z | ٥ | 7 | _ | O | | | | | | | | | | | | 1993 | o c |
| -19-7 | Z | ۵ | 4 | 9 | - | 210 | | | | | | | | | | | 1330 | o c |
| | | | | | | | | | | | | | | | | | |) |
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Appendix 6. Continued.

| | Eggs | 000 | | | 42523 6539 0 10787 | 0 0 0 0 82 46743 0 | 0000000 | 0000000 |
|----------------|-----------------|--------------|----------------------------|----------------------------|--|---|--|--|
| | Total Larvae | 67 100 | 60 60 64 60 60 | 593 637 1584 | 9064 5353 3515 3873 | 498 360 348 378 1598 4979 1110 | 0 392 1112 1598 3105 2907 295 | 0 0 644 708 2180 1236 967 485 |
| | Misc. | | | | | | | |
| | FS | | | | | | | |
| | S S | | | | | | | |
| | SS | | | | | | | |
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| /Group | CP | | | | | | | |
| Species/Groups | D, | | | | | | · | |
| V. | 4 | | | | | | | |
| | ΥP | | | | 14 | | | |
| | NS. | | | | | | | |
| | SP | | | | | | | |
| | AL | 67 100 | 949 | 593 637 1584 | 8923 5353 3515 3873 | 498 360 348 379 1598 4979 1110 | 392 1112 1598 3105 2907 295 | 644 708 2180 1236 967 485 |
| ers | Temp | 19.5 19.5 | | | 20.5 20.5 20.5 19.2 | 20.2 20.2 20.2 18.5 21.5 21.5 16.3 | 22.0 22.0 22.0 21.2 22.6 22.6 22.6 | 21.1 21.1 18.2 20.5 20.5 15.5 |
| Paramete | Dpt | 0-0 | , O | 97 | 35-0 | 0-040-04 | 0-040-06 | 0-040-04 |
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| ашрје | 10 | 000 | | | ZZZZ | 00002222 | 00002222 | 00002222 |
| Sam | Date | 6-19-73 | -19-7 | - 18-7 - 18-7 - 18-7 | 6-18-73 6-18-73 6-18-73 6-18-73 | 6 - 18 - 73 6 - 18 - 73 6 - 18 - 73 6 - 18 - 73 6 - 18 - 73 6 - 18 - 73 6 - 18 - 73 | 7 - 17 - 73 7 - 17 - 73 7 - 17 - 73 7 - 17 - 73 7 - 17 - 73 7 - 17 - 73 | 7 - 17 - 73 7 - 17 - 73 7 - 17 - 73 7 - 17 - 73 7 - 17 - 73 7 - 17 - 73 |

Appendix 6. Continued.

| Temp T | Temp Temp Temp AL SP SM YP TP JD CP BR SS NS FS MISC. 2 21.0 480 2 22.2 82 2 22.2 1129 2 22.5 105 2 22.5 1 | Dpt C C C C C C C C C C | ample Parameters | ω | | • | | S | Species/Groups | /Group | 25 | | | | | | |
|--|--|--|------------------|----------------|----|----|----|----|----------------|--------|----|-----|----|----|-------|-----------------|------|
| 10 21 0 480 2 21 0 480 2 21 0 141 2 21 0 141 2 22 1 82 2 22 2 12 6 129 2 22 6 129 2 22 6 129 2 22 6 129 2 22 7 120 2 22 7 120 2 22 8 180 2 24 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | 21.0 480 21.0 480 21.0 141 17.9 560 22.2 1129 22.2 1129 22.2 570 22.6 315 22.6 315 22.6 315 22.6 315 22.6 315 22.6 315 22.6 315 22.6 315 22.8 540 21.8 668 18.2 535 11.3 11.3 11.3 11.3 11.3 8.5 11.3 8.5 | 0 21.0 480 2 21.0 141 7 17.9 560 0 22.2 1729 2 22.2 570 0 22.2 1729 1 22.6 315 2 22.6 720 0 22.5 100 2 22.5 100 2 22.6 315 1 22.5 190 2 22.5 190 2 22.5 190 2 22.5 190 2 22.5 190 4 18.3 568 4 18.3 568 6 11.3 570 6 11.3 570 7 11 | a Dpt | | SP | SM | ٩× | 47 | 9 | СР | BR | \$8 | SN | FS | Misc. | Total Larvae | Eggs |
| 1 21.0 1 21.0 1 17.9 2 21.0 1 17.9 560 2 22.2 1 129 2 22.2 1 105 2 22.6 | 21.0 21.0 17.9 22.2 22.2 22.2 22.2 22.2 1129 22.6 315 22.6 315 22.6 315 22.6 315 22.6 315 22.6 315 22.9 19.9 21.8 16.9 21.8 16.9 21.8 16.9 21.8 16.9 21.8 16.3 17.0 21.8 16.9 21.8 16.9 21.8 16.9 21.8 21.8 22.9 23.9 24.0 25.0 26.0 27.0 | 2 21.0 141 17.9 560 141 22.2 12.2 12.2 12.2 12.2 12.2 12.2 | 0 2 | 0. | | | | | | | | | | | | 480 | 0 |
| 2 2.2 2 129 2 2.2 2 1739 2 2.2 2 1739 2 2.2 2 1739 2 2.2 2 1739 2 2.2 2 1739 2 2.2 5 570 2 2.2 5 570 2 2.2 5 570 2 2.2 5 570 2 2.2 5 570 2 2.2 5 720 2 2.2 5 720 2 2.2 5 720 2 2.2 5 720 2 2.2 5 720 2 1.2 5 720 2 1.2 5 720 2 1.2 5 720 2 1.2 5 720 2 1.2 5 720 2 1.2 5 720 2 1.2 5 720 2 1.3 5 720 2 | 22.2 22.2 22.2 22.2 22.2 22.2 22.6 315 22.6 315 22.6 315 22.6 315 22.6 315 22.6 315 22.6 315 19.9 22.5 19.9 22.5 19.9 22.5 19.9 21.8 668 18.2 21.8 668 14.3 11.3 11.3 11.3 11.3 11.3 11.3 11.3 | 2 2.2 82 82 82 82 82 82 82 82 82 82 82 82 82 | + 0 | 0.0 | | | | | | | | | | | | 0; | 0 0 |
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| 22.2 1105 22.6 529 22.5 720 22.5 720 22.5 720 22.18 165 22.18 540 22.18 668 22.19 742 22.19 720 22.18 668 22.19 720 22.19 720 22.19 720 22.10 720 22.10 720 22.10 720 23.10 720 24.10 720 25.10 720 25.10 720 26.10 720 27.10 720 | 22.2 1105 22.6 529 22.6 529 19.9 579 19.9 579 22.5 190 22.5 190 22.5 190 22.5 190 22.5 236 22.5 236 21.8 668 18.2 535 11.3 11.3 11.3 11.3 11.3 11.3 11.3 11.3 | 2 2 2 105 2 2 6 529 2 2 6 742 3 19.9 2 2 2 5 720 4 2 2 5 190 6 2 1 8 668 4 18.2 2 14.3 9 12.2 1 11.3 6 14.3 1 11.3 6 11.3 | 2 2 | 7. | | | | | | | | | | | | 570 | Ċ |
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| 4 18.2 535 0 11.3 0 1 11.3 0 2 11.3 0 3 9.2 0 4 11.3 67 6 0 0 1 11.3 0 4 8.5 0 1 11.3 0 4 8.5 0 | 18.2 11.3 11.3 14.3 14.3 14.3 11.3 11.3 11.3 | 4 18.2 535 0 11.3 1 11.3 9 2 1 14.3 1 14.3 2 14.3 3 12.2 0 11.3 4 8.5 4 8.5 | 2 2 | 1.8 | | | | | | | | | | | | 668 | 0 |
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| 2 14.3 3 12.2 0 11.3 67 67 67 67 67 67 67 67 67 68 67 68 68 68 68 68 | 2. 2. 1. 1. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. | 2 14.3 3 12.2 0 11.3 1 11.3 67 4 8.5 0 11.3 1 11.3 4 8.5 | - | 4 | | | | | | | | | | | | 0 | 0 |
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| 0 11.3 67 67 67 1 11.3 67 67 67 2 11.3 0 0 11.3 0 1 11.3 0 2 11.3 0 | £ £ £ £ £ £ £ £ £ £ £ £ £ £ £ £ £ £ £ | 0 11.3 1 11.3 2 11.3 4 8.5 0 11.3 1 11.3 4 8.5 | е - | 5 | | | | | | | | | | | | 0 | 0 |
| 1 11.3 67 67 2 11.3 0 4 8.5 0 1 11.3 0 1 11.3 0 4 8.5 0 | 6.11 8.10 1.10 1.10 1.10 1.10 1.10 1.10 1 | 1 11.3 67 2 11.3 4 8.5 0 11.3 1 11.3 4 8.5 | 0 | | | | | | | | | | | | | 0 | 0 |
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| | 0 | | 4 | | | | | | | | | | | | | 0 | 0 |

Appendix 6. Continued.

| | ameters | | | | | Ī | Species/Groups | /Group | ري د | | | | | | |
|----------------------|----------------|------|----|----|-------|------|----------------|--------|---------|----|----|----|-------|-----------------|------------|
| Date D1 Sta | Temp Dpt C | AL | SP | SM | d. >- | 1 41 | g, | d O | BR | 88 | NS | FS | Misc. | Total Larvae | Eggs |
| | : | | | | | | | | | | | | | 8 0 | 0 |
| -22-73 D | 4 4 | 86.4 | | | | | | | | | | | | 414 | 0 |
| -22-/3 D -22-73 D | 14 | 1 | | | | | | | | | | | | 0 | 231 |
| 8-22-73 D E | 9 | | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | c | C |
| -22-73 D | 9 | | | | | | | | | | | | | o c | 0 0 |
| -22-73 D | 9 | ! | | | | | | | | | | | | 57 | 0 |
| 8-22-73 D G | 2 16.5 | 2 (| | | | | | | | | | | | 0 | 355 |
| N EZ-22- | 4 4 | 368 | | | | | | | | | | | | 368 | 0 |
| -22-73 N | 4 | 88 | | | | | | | | | | | | 88 | 0 |
| -22-73 N | 4 | | | | | | | | | | | | | 0 (| 0 (|
| -22-73 N | 16. | • | | | | | | | | | | | | 0 | 0 |
| 0 22-22 | +7 | | | | | | | | | | | | | 0 | 0 |
| -22-73 0 | | 133 | | | | | | | | | | | | 133 | С |
| 8-22-73 D H | 2 17.0 | 2 | | | | | | | | | | | | 0 | 0 |
| -22-73 D | 15 | | | | | | | | | | | | | 0 | 0 |
| -22-73 N | 17. | | | | | | | | | | | | | 0 (|) (|
| -22-73 N | 17. | | | | | | | | | | | | | o ; |) |
| -22-73 N | 17. | 644 | | | | | | | | | | | | 644 | o (|
| -22-73 N | 1 5 | 184 | | | | | | | | | | | | 184 | 0 |
| N 67-10- | 14 | | | | | | | | | | | | | 0 | 0 |
| N 67-10- | | | | | | | | | | | | | | 0 | 0 |
| N EZ-10- | 4 | | | | | | | | | | | | | 0 | 0 |
| 8-21-73 N M | | | | | | | | | | | | | | 0 | 0 |
| | . ! | | | | | | | | | | | | | c | C |
| -18-73 D | 1 3 | | | | | | | | | | | | | o c | 0 |
| -18-73 D | 13 | | | | | | | | | | | | | o c | 0 |
| -18-73 D | <u>.</u> | | | | | | | | | | | | | o C |) C |
| -18-73 D | 15 | | | | | | | | | | | | | o C |) C |
| -19-73 N | | | | | | | | | | | | | | o C | 0 |
| 9-18-73 N C | 9.51 | | | | | | | | | | | | | 0 | 0 |
| N E/-81- | 5 6 | | | | | | | | | | | | | C | С |
| -18-73 N | 13 | | | | | | | | | | | | |) |) |
| | | | | | | | | | | | | | | | |

Appendix 6. Continued.

| Date Di Sta Dpt C AL SP SM YP TP JD CP BR SS NS F5 Misc. Larvae Eggs 9-18-73 D D (12.5 9) 9-18-73 D D (12.5 9) 9-18-73 D D (12.5 9) 9-18-73 D D (12.5 9) 9-18-73 D D (12.5 9) 9-18-73 D D (12.5 9) 9-18-73 D D (12.5 9) 9-18-73 D D (12.2 9) 9-18-73 D D (12.2 9) 9-18-73 D D (12.2 9) 9-18-73 D D (12.2 9) 9-18-73 D D (12.2 9) 9-18-73 D D (12.2 9) 9-18-73 D D (12.2 9) 9-18-73 D D D (12.2 9) 9-18-73 D D D D D D D D D D D D D D D D D D D | 10 Sta Dpt C AL SP SM YP TP JD CP BR SS NS FS Misc. Larvae 18-73 D D 0 12 5 12 5 12 5 12 5 12 5 12 5 12 5 12 | Sample Pa | arameter | ers | | | | | Σ | Species/Groups | /Group | ស | | | | | | |
|---|---|-----------|----------|-----|----|----|----|----|-----|----------------|--------|----|----|----|----|-------|-----------------|------|
| | | S 10 e | do | - | AL | SP | SM | γP | 1.0 | ٩٢ | CP | BR | 88 | NS | FS | Misc. | Total Larvae | Eggs |
| 1 | 18-73 D D 1 12 5 18-73 N D 2 12 5 18-73 N D 2 4 13 5 18-73 N D 2 14 2 18-73 D G 0 11 0 17-73 D G 0 11 0 17-73 D G 0 11 0 17-73 D G 0 14 5 18-73 N G 0 14 5 18-73 N G 0 14 5 18-73 N G 0 14 5 18-73 N G 0 14 5 18-73 N G 0 14 5 18-73 N G 0 14 5 18-73 N G 0 14 5 18-73 N H 1 12 2 17-73 D H 1 12 2 17-73 D H 2 12 2 17-73 D H 2 12 2 17-73 D H 3 13 7 17-73 D G 0 13 7 17-73 D G 0 13 7 17-73 D G 0 13 7 17-73 D G 0 13 7 17-73 D G 0 13 7 17-73 D C 0 13 7 17-73 D C 0 13 7 17-73 D C 0 13 7 17-73 D C 0 13 7 17-73 D C 0 13 7 17-73 D C 0 13 7 17-73 D C 0 13 7 17-73 D C 0 13 7 17-73 D C 0 13 7 17-73 D C 0 13 7 17-73 D C 0 13 7 17-73 D C 0 13 7 17-73 D C 0 13 7 17-73 D C 0 13 7 17-74 D C 0 13 7 17-75 D C 0 15 7 17-75 D C 0 15 7 17-75 D C 0 15 7 17-75 D C 0 15 7 17-75 D C 0 15 7 17-75 D C 0 15 7 17-75 D C 0 15 7 17-75 D C 0 15 7 17-75 D C 0 15 7 17-75 D C 0 15 7 17-75 D C 0 15 7 17-75 D C 0 15 7 17-75 D C 0 15 7 17-75 D C | -18-73 D | | | | | | | | | | | | | | | 0 | 0 |
| 18-73 D D 2 18-5 18-73 N D 0 14-12 18-73 N D 0 14-12 18-73 N D 2 14-2 18-73 N D 2 14-2 18-73 N D 2 14-5 18-73 N D 14-5 18-74 N D 14-5 18-75 N D D D D 18-75 N D D D 18-75 N D D D 18-75 N D D D 18-75 N D D D 18-75 N D D D 18-75 N D D D 18-75 N D D 18-75 N D D 18-75 N D D 18-75 N D D 18-75 N D D 18-75 N D 18-75 N D 18-75 N D 18-75 N D 18-75 N D 18-75 N D 18-75 N D 18-75 N D 18-75 N D 18-75 N D 18-75 N 18-75 N D 18-75 N 18-75 | 18-73 D D 2 12.5 18-73 N D 0 4 42.0 18-73 N D 0 14 42.0 18-73 N D 0 14 42.0 18-73 N D 0 14 42.0 17-73 D G 0 11.0 17-73 D G 0 11.0 17-73 D G 1 14.5 18-73 N G 1 14.5 18-73 N G 1 14.5 18-73 N G 1 14.5 18-73 N G 1 14.5 18-73 N G 1 14.5 18-73 N G 1 14.5 18-73 N G 1 14.5 18-73 N G 1 14.5 18-73 N G 1 14.5 18-73 N H 1 16.2 17-73 D H 1 16.2 17-73 D H 1 16.2 17-73 D H 1 16.5 17-73 D H 1 16.5 17-73 D H 2 14.5 17-73 D H 3 14.5 17-73 D H 4 1 16.5 17-73 D H 5 14.5 17-73 D H 7 16.5 17-73 D H 7 16.5 17-73 D H 7 16.5 17-73 D H 7 16.5 17-73 D H 7 16.5 17-73 D H 7 16.5 17-73 D H 7 16.5 17-73 D H 7 16.5 17-74 D H 7 16.5 17-75 D H | -18-73 D | | 8 | | | | | | | | | | | | | 0 | 0 |
| 18-73 D D 4 9.0 0 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 0 14.2 0 0 14.2 0 0 0 14.5 0 0 0 14.5 0 0 0 14.5 0 0 0 14.5 0 0 0 0 0 0 0 0 0 | 18-73 N D 4 9.0 18-73 N D 1 14.2 18-73 N D 1 14.2 17-73 D G O 11.0 17-73 D G O 11.0 17-73 D G O 11.0 17-73 D G O 11.0 17-73 D G O 11.0 17-73 D G O 11.0 17-73 D G O 11.0 18-73 N G O 14.5 18-73 N G O 14.5 18-73 N G O 14.5 18-73 N G O 14.5 18-73 N G O 14.5 18-73 N H I I I I I I I I I I I I I I I I I I | -18-73 D | | 5 | | | | | | | | | | | | | 0 | 0 |
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Appendix 6. Continued.

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| 73 D G 1 15.1 73 D G 2 15.1 73 N G 0 14.2 73 N G 1 14.2 73 N G 1 14.2 73 N G 1 14.2 73 D H 0 14.9 73 D H 0 14.9 73 D H 0 14.9 73 D H 2 14.9 73 D H 2 14.9 73 D H 2 14.9 73 D H 2 14.9 73 D H 2 14.6 73 N H 1 14.6 73 N H 2 14.6 73 D M 2 14.5 73 D M 3 14.5 | 73 D G 1 15 73 D G 2 15 73 N G 0 14 73 N G 0 14 73 N G 0 14 73 N G 1 14 73 N G 1 14 73 D H 0 14 73 D H 0 14 73 D H 0 14 73 D H 0 14 73 D H 0 14 73 D H 0 14 73 D H 0 14 73 D H 0 14 73 D H 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 74 D M 0 14 75 D M 0 14 76 D M 0 14 77 D M 0 14 77 D M 0 14 77 D M 0 14 77 D M 0 14 78 D M 0 14 79 D M 0 14 79 D M 0 14 79 D M 0 14 79 D M 0 14 79 D M 0 14 79 D M 0 14 79 D M 0 14 79 D M 0 14 79 D M 0 14 79 D M 0 14 79 D M 0 14 79 D M 0 14 | 73 D G | ţ | | | | | | | | | | | | | o (| O |
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| 73 D G 3 15.1 73 N G 0 14.2 73 N G 1 14.2 73 N G 1 14.2 73 D H 0 14.9 73 D H 0 14.9 73 D H 2 14.9 73 D H 2 14.6 73 N H 0 14.6 73 D N D 14.5 73 D M 0 14.5 73 D M 0 14.5 73 D M 0 14.5 73 D M 0 14.5 73 D M 0 14.5 73 D M 2 14.5 73 D M 2 14.5 | 73 D G 3 15 73 N G 0 14 73 N G 1 14 73 N G 1 14 73 N G 1 14 73 D H 0 14 73 D H 0 14 73 D H 0 14 73 D H 2 14 73 D H 2 14 73 D H 2 14 73 D H 2 14 73 D H 3 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 74 D M 0 14 75 D M 0 14 76 D M 0 14 77 D M 0 14 78 D M 0 14 79 D M 0 14 70 D M | .73 D G | 15 | | | | | | | | | | | | | 0 0 | > 0 |
| 73 N G 0 14.2 73 N G 1 14.2 73 N G 2 14.2 73 N G 2 14.2 73 D H 0 14.9 73 D H 0 14.9 73 D H 0 14.6 73 N H 0 14.6 73 N H 2 14.6 73 N H 2 14.6 73 D M 0 14.5 73 D M 0 14.5 73 D M 0 14.5 73 D M 3 14.5 | 73 N G 14 73 N G 1 14 73 N G 1 14 73 N G 2 14 73 D H 0 14 73 D H 2 14 73 D H 2 14 73 D H 2 14 73 N H 0 14 73 N H 0 14 73 N H 0 14 73 N H 1 14 73 D M 1 14 73 D M 3 14 | .73 D G | 15 | | | | | | | | | | | | | 0 | |
| 73 N G 1 14.2 73 N G 2 14.2 73 N G 2 14.2 73 N G 3 14.5 73 D H 0 14.9 73 D H 1 14.9 73 D H 2 14.9 73 N H 1 14.6 73 N H 2 14.6 73 N H 2 14.6 73 N H 2 14.5 73 D M 0 14.5 73 D M 2 14.5 73 D M 3 14.5 | 73 N G 1 14 73 N G 2 14 73 N G 2 14 73 D H G 14 73 D H C 14 73 D H C 14 73 D H C 14 73 N H C 14 73 N H C 14 73 N H C 14 73 N H C 14 73 N H C 14 73 N H C 14 73 D M C 14 73 D M C 14 73 D M C 14 73 D M C 14 73 D M C 14 73 D M C 14 | -73 N G | 14 | | | | | | | | | | | | | o 0 | |
| 73 N G 2 14.2 73 N G 3 14.5 73 N G 3 14.5 73 D H 0 14.9 73 D H 2 14.9 73 D H 2 14.9 73 N H 0 14.6 73 N H 1 14.6 73 N H 2 14.6 73 N H 2 14.6 73 N H 2 14.6 73 N H 2 14.6 73 N H 2 14.5 73 D M 2 14.5 73 D M 2 14.5 | 73 N G 2 14 73 N G 3 14 73 D H 0 14 73 D H 1 14 73 D H 2 14 73 N H 0 14 73 N H 0 14 73 N H 1 14 73 N H 2 14 73 N H 2 14 73 D M 0 14 73 D M 3 14 73 D M 3 14 | .73 N G | 14 | | | | | | | | | | | | | > 0 | > < |
| 73 N G 3 14.5 73 D H O 14.9 73 D H 2 14.9 73 D H 2 14.9 73 N H O 14.6 73 N H 2 14.6 73 N H 2 14.6 73 N H 2 14.6 73 N H 2 14.6 73 D M O 14.5 73 D M O 14.5 73 D M 3 14.5 | 73 N G 3 14 73 D H 0 14 73 D H 1 144 73 D H 2 14 73 N H 0 14 73 N H 1 14 73 N H 2 14 73 N H 2 14 73 N H 2 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 73 D M 0 14 | 9-13 N G | 14 | | | | | | | | | | | | | | o c |
| 73 D H O 14.9 73 D H 1 14.9 73 D H 2 14.9 73 D H 2 14.9 73 N H 0 14.6 73 N H 1 14.6 73 N H 2 14.6 73 N H 2 14.6 73 D M O 14.5 73 D M O 14.5 73 D M 2 14.5 73 D M 3 14.5 | 73 D H O 14 73 D H C 14 73 D H 2 14 73 D H 2 14 73 N H O 14 73 N H 2 14 73 N H 2 14 73 D M O 14 73 D M O 14 73 D M 3 14 | 9-73 N G | 4 | | | | | | | | | | | | | > |) |
| 73 D H 1 14.9 73 D H 2 14.9 73 D H 4 14.3 73 N H 0 14.6 73 N H 1 14.6 73 N H 2 14.6 73 N H 2 14.6 73 D M 0 14.5 73 D M 0 14.5 73 D M 2 14.5 73 D M 3 14.5 | 773 D H 1 14 773 D H 2 14 773 D H 2 14 773 N H 0 14 773 N H 1 14 773 D M 1 14 773 D M 0 14 773 D M 0 14 773 D M 2 14 773 D M 2 14 773 D M 3 14 | -73 D H | 14 | | | | | | | | | | | | | 0 | 0 |
| 73 D H 2 14.9 73 N H 0 14.6 73 N H 1 14.6 73 N H 2 14.6 73 N H 2 14.6 73 N H 2 14.6 73 N H 2 14.6 73 D M 0 14.5 73 D M 0 14.5 73 D M 2 14.5 73 D M 3 14.5 | 73 D H 2 14 14 14 14 14 14 14 14 14 14 14 14 14 | -73 D H | 14 | | | | | | | | | | | | |) | 0 (|
| 73 D H 4 14.3 73 N H 0 14.6 73 N H 1 14.6 73 N H 2 14.6 73 D M 0 14.5 73 D M 0 14.5 73 D M 2 14.5 73 D M 2 14.5 | 73 D H 4 14 73 N H 0 14 73 N H 1 14 14 14 14 14 14 14 14 14 14 14 14 1 | -73 D H | 14 | | | | | | | | | | | | |) | > C |
| 73 N H O 14.6 73 N H 1 14.6 73 N H 2 14.6 73 N H 2 14.6 73 D M O 14.5 73 D M 1 14.5 73 D M 2 14.5 73 D M 3 14.5 | 73 N H 0 14 73 N H 1 14 73 N H 2 14 73 N H 2 14 73 D M 0 14 73 D M 1 14 73 D M 3 14 | -73 D H | 4 | | | | | | | | | | | | | o (| 0 0 |
| 73 N H 1 14.6 73 N H 2 14.6 73 N H 4 14.6 73 D M 0 14.5 73 D M 1 14.5 73 D M 2 14.5 73 D M 3 14.5 | 73 N H 1 14 73 N H 2 14 73 N H 2 14 73 D M 0 14 73 D M 1 14 73 D M 3 14 73 D M 3 14 | -73 N H | 14 | | | | | | | | | | | | | o (| 0 (|
| 73 N H 2 14.6 73 N H 4 14.6 73 D M 0 14.5 73 D M 2 14.5 73 D M 2 14.5 73 D M 3 14.5 | 73 N H 2 14 73 N H 4 14 73 D M 0 14 73 D M 2 14 73 D M 3 14 | -73 N H | 4 | | | | | | | | | | | | | > (| 0 (|
| 73 N H 4 14.6 73 D M 0 14.5 73 D M 1 14.5 73 D M 2 14.5 73 D M 3 14.5 | 73 N H 4 14 73 D M 0 14 73 D M 1 14 73 D M 2 14 73 D M 3 14 | -73 N H | 14 | | | | | | | | | | | | | O (| 0 0 |
| 73 D M O 14.5 73 D M 1 14.5 73 D M 2 14.5 73 D M 3 14.5 | -73 D M O 14 -73 D M 1 14 -73 D M 2 14 -73 D M 3 14 | -26-73 N H | 14 | | | | | | | | | | | | | 0 | O |
| 73 D M O 14.5 73 D M 1 14.5 73 D M 2 14.5 73 D M 3 14.5 | 73 D M O 14 73 D M 1 14 73 D M 2 14 73 D M 3 14 | | | | | | | | | | | | | | | c | C |
| 73 D M 1 14.5 73 D M 2 14.5 73 D M 3 14.5 | -73 D M 1 14 -73 D M 2 14 -73 D M 3 14 | -73 D M | 14 | | | | | | | | | | | | | o c | C |
| -73 D M 2 14.5 -73 D M 3 14.5 | -73 D M 2 14 -73 D M 3 14 | -73 D M | 14 | | | | | | | | | | | | | O | o c |
| -73 D M 3 14.5 | -73 D M 3 14 | -73 D M | 14 | | | | | | | | | | | | | o c | |
| | | -73 D M | 14 | | | | | | | | | | | | | > | > |

Appendix 7. Densities (no./1,000 m³) for fish eggs and larvae collected at beach (A, B, F) and open water (C, D, G, H, E) stations in Cook Plant study areas, southeastern Lake Michigan, 1974.

| Sample | | Parameter | etei | Ø | | | | ; |) | | | | | | | | | |
|---|----------|-----------|----------|--|----|----|----|----|----|-----|----|----|-----|----|----|-------|-----------------|--|
| Date | D1 S | Sta D | Dpt 1 | Temp C | AL | SP | SM | ΥP | 41 | مار | СР | BR | \$8 | NS | FS | Misc. | Total Larvae | Eggs |
| 1-29-74 | 0 0 | 4 4 | 00 | 0.4 0.4 | | | | | | | | | | | | | 00 | 1939 1587 |
| 1-29-74 1-29-74 | 0 | 88 | 00 | 4.0 | | | | | | | | | | | | | 00 | 5000 873 |
| 3-15-74 3-15-74 3-06-74 3-06-74 | 00 Z Z | 4444 | 0000 | 4 4 8 8 8 9 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 | | | | | | | | | | | | | 0000 | 0000 |
| 3-15-74 3-15-74 3-06-74 3-06-74 | 0 0 Z Z | 8888 | 0000 | 33.8 6.2 6.2 | | | | | | | | | | | | | 0000 | 0000 |
| 3-15-74 3-15-74 3-14-74 3-14-74 | 00ZZ | | 0000 | 33.5 4.2 4.2 | | | | | | | | | | | | | 0000 | 0000 |
| 4 - 18 - 74 4 - 03 - 74 4 - 24 - 74 4 - 09 - 74 4 - 18 - 74 4 - 24 - 74 4 - 24 - 74 4 - 20 - 74 4 - 20 - 74 | 000000ZZ | 444444444 | -000-000 | 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 | | | | | | | | | | | | | 000000000 | 588 588 0 0 0 172 0 0 |
| 4-09-74 4-03-74 4-18-74 4-03-74 4-09-74 4-18-74 4-20-74 | 00000ZZ | | 00-00 | 5.5 10.2 10.2 11.5 11.5 | | | | | | | | | | | | | 000000 | 238 0 0 0 0 |

Appendix 7. Continued.

| | ימו מווים כני כ |) | n | | | | | 5 |) | 100 5 (00.000) |) | | | | | | |
|----------------|-----------------|----------|-------------|----|----|-------|----------|-----|---|----------------|------|----|-----|---|----|---------------|---------------|
| | | | Temp | | 6 | 70 | \$ | 100 | 9 | ٥ | a da | 88 | V V | | W. | Total | Eags |
| ate DIS | sta u | nbr | ر | AL | 70 | DIG. | <u>-</u> | - | 3 | 5 | 5 | 3 | | , | | | |
| | ı | | | | | | | | | | | | | | | c | 0 |
| 8-74 | u. | | ς. | | | | | | | | | | | | | • • | 0 0 |
| -74 | u. | | ٠ | | | | | | | | | | | | | 0 | |
| -74 | Ľ. | _ | | | | | | | | | | | | | | > (| 0 (|
| 19-74 N | u. | - | 8.2 | | | | | | | | | | | | | 0 | 0 |
| , | | , | | | | 9 | | | | | | | | | | 110 | 1325 |
| 74 | ⋖ · | | 41.4 | | | 2 5 | | | | | | | | | | 104 | 1930 |
| -74 | ⋖ . | | 11.5 | | | 104 | | | | | | | | | | 104 | 0 |
| -74 | ⋖ | | 9.5 | | | 1041 | | | | | | | | | | 276 | o c |
| | 4 | | 9.5 | | | 276 | | | | | | | | | | 9 (| |
| -74 | 4 | | 12.7 | | | | | | | | | | | | | o c | |
| -74 | ⋖ | | 12.7 | | | | | | | | | | | | | | |
| -74 | ⋖ | | 12.0 | | | | | | | | | | | | | o 0 | O |
| -74 | ⋖ | | 12.0 | | | | | | | | | | | | | 0 (| 0 (|
| -74 | ۷ | | 11.0 | | | 1632 | | | | | | | | | | 1632 | 0 ; |
| -74 | < | | 11.0 | | | 4285 | | | | - | | | | | | 4285 | 4/6 |
| -74 | 4 | | 8 .0 | | | | | | | | | | | | | 0 ; | 0 (|
| -74 | 4 | | 0.8 | | | 444 | | | | | | | | | | 444 | 0 (|
| -74 | ۷ | | 11.1 | | | 306 | | | | | | | | | | 306 | > (|
| - 7 | ⋖ | 0 | 11.1 | | | 139 | | | | | | | | | | 139 | 0 |
| | c | | | | | 40 | | | | | | | | | | 165 | 1490 |
| , , | ء د | | | | | 2 | | | | | | | | | | 0 | 1179 |
| 3-74 0 | ם מ | . | 0.0 | | | 60 | | | | | | | | | | 92 | 0 |
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| 1 . | 0 6 | | | | | 2 | | | | | | | | | | 0 | 0 |
| | ם מ | | | | | 023 | | | | | | | | | | 833 | 0 |
| 4 . | م م | | | | | 9 | | | | | | | | | | 0 | 0 |
| 4 4 | ם מ | | | | | | | | | | | | | | | 0 | 0 |
| 4/- | ומ | | | | | 0 | | | | | | | | | | 430 | C |
| - / 4 | 20 1 | | | | | 0 t 0 | | | | | | | | | | 200 | С |
| -74 | 8 | | | | | 202 | | | | | | | | | | 350 |) C |
| - 74 | 8 | | | | | 350 | | | | | | | | | | 000 | 0 0 |
| -74 | 8 | | | | | 150 | | | | | | | | | | 000 | 0 |
| | 1 | | | | | 290 | | | | | | | | | | 290 | 0 |

Appendix 7. Continued.

| Date Dista Det C AL SP N TP UD CP BR SS NS FS Misc. Larvae Eggs 5-03-74 D C 0.5 5 222 14666 222 1486 222 222 222 222 222 222 222 222 222 222 222 222 222 222 222 222 <t< th=""><th> Total Distance D</th><th>Sample</th><th></th><th>Parameter</th><th>eters</th><th></th><th></th><th></th><th></th><th></th><th>SF</th><th>Species/Groups</th><th>/Group</th><th>ิ่ง</th><th></th><th></th><th></th><th></th><th></th><th></th></t<> | Total Distance D | Sample | | Parameter | eters | | | | | | SF | Species/Groups | /Group | ิ่ง | | | | | | |
|---|--|--------|-----|-----------|---------------|----------------|-----|------|-----|-----|----|----------------|--------|-----|----|-----|---|-------|-----------------|---------|
| 03-74 0 F 0 9.5 | 03-74 D F O 9.5 -17-74 D F O 12.7 -17-74 D A O 18.2 -17-74 D A O 18.5 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.5 -17-74 D B O 18.8 -17-74 D B O 18.7 -17-74 D B O 18.7 -17-74 D B O 18.7 -17-74 D B O 18.7 -17-74 D B O 18.7 -17-74 D B O 18.7 -17-74 D B O 18.7 -17-74 D B O 18.7 -17-74 D D D D D D D D D D D D D D D D D D D | t e | _ | ta | - | 유 | AL | SP | NS | γÞ | TP | a٢ | СР | BR | SS | N.S | | Misc. | Total Larvae | Eggs |
| 0.05 77 0 F 0 0 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 0.05 74 N F 0 19 5 | -03-7 | _ | | | L. | | | | | | | | | | | | | o | 10340 |
| 14774 D F O 12.7 383 383 383 383 383 383 383 383 383 38 | 17.74 D F O 12.7 383 222 2 | -03-7 | ۵ ۵ | | | ים י | | | | | | | | | | | | | 0 | 14666 |
| 147-74 N F O (12.7) 1893 383 157-74 N F O (11.0) 952 952 101-74 N F O (11.0) 952 952 101-74 N F O (18.2) 968 195 391 101-74 D A O (18.8) 3759 9759 9759 111-74 D A O (18.8) 3759 9759 9759 111-74 D A O (17.0) 916 925 935 111-74 D A O (17.0) 916 935 944 112-74 N A O (18.5) 935 935 9344 112-74 N A O (18.2) 93769 93769 93769 112-74 N A O (18.2) 93769 93769 93769 111-14 D B O (18.5) 93769 93769 93769 111-14 D B O (18.5) 93769 93769 93769 111-14 D B O (18.0) 93769 93769 93769 111-14 D B O (18.0) 940 940 940 | -17-74 N F 0 110 952 952 952 952 952 952 952 952 952 952 | -17-7 | ۵ | | 12 | . 7 | | | 222 | | | | | | | | | | 222 | 0 |
| -02-74 N F O 11.0 -15-74 N A O 18.5 -15-74 N B O 18.0 -15-75 N B O 18.0 -15-75 N B O | 0.02-74 N F 0 11.0 16.74 N F 0 11.0 16.74 N F 0 11.0 16.74 N F 0 11.0 16.74 N F 0 11.0 16.74 N F 0 11.0 16.74 N R 0 18.5 17.74 D A 0 18.5 18.8 | -17-7 | 0 | | 12 | .7 | | | 383 | | | | | | | | | | 383 | 255 |
| -16 - 74 N F O 11.0 -17 - 74 N F O 11.9 -18 - 74 N F O 11.9 -18 - 74 N F O 11.9 -17 - 74 N F O 11.9 -18 - 74 N F O 11.9 -18 - 74 N R O 18.5 -18 - 74 | 0-0-74 N F O 11.0 15-74 N F O 11.0 15-74 N F O 11.9 952 15-74 N F O 11.9 952 15-74 N F O 11.9 952 15-74 N A O 18.2 17-74 D A O 18.5 17-74 D A O 18.5 17-74 D A O 18.5 17-74 D A O 18.5 17-74 D A O 18.5 17-74 D A O 18.5 17-74 D A O 18.5 17-74 D A O 18.5 17-74 D A O 18.5 17-74 D A O 18.5 17-74 D A O 18.5 17-74 D A O 18.5 17-74 D A O 18.5 17-74 D A O 18.5 17-74 D A O 19.5 17-74 D B O 18.5 02-7 | z | | Ξ | 0. | | | | | | | | | | | | | 0 | 0 |
| -15-74 N F O 11:9 952 -15-74 N F O 11:9 952 -15-74 N F O 11:9 634 -16-74 N F O 11:9 634 -01-74 D A O 18:5 88 -01-74 D A O 18:5 88 -01-74 D A O 18:5 988 -11-74 D A O 17:0 516 1629 -26-74 D A O 18:5 956 835 139 -26-74 D A O 18:5 956 835 139 -25-74 N A O 18:2 956 835 139 -25-74 N A O 18:1 65 65 65 63 -25-74 N A O 18:1 65 65 65 63 -25-74 N A O 18:1 65 65 65 63 -25-74 N A O 18:1 65 65 65 63 -25-74 N A O 18:2 9769 -11-74 D B O 18:2 9769 -11-74 D B O 18:0 951 474 -11-74 D B O 18:0 951 475 -12-74 N B O 18:0 951 475 -12-74 N B O 18:0 951 474 -12-74 N B O 18:0 951 474 -12-74 N B O 18:0 951 474 -12-74 N B O 18:0 971 44 -12-74 N B O 18:0 971 44 -12-74 N B O 18:0 971 44 -12-74 N B O 18:0 971 44 -12-74 N B O 18:0 971 473 916 -12-74 N B O 18:0 971 473 916 -12-74 N B O 18:0 971 473 916 -12-74 N B O 18:0 971 473 916 -12-74 N B O 18:0 971 473 916 -12-74 N B O 18:0 971 473 916 | 15-74 N F 0 11.9 952 952 15-74 N F 0 11.9 952 952 15-74 N F 0 11.9 634 952 15-74 D A 0 18.2 288 952 952 -01-74 D A 0 18.5 186 195 391 188 -05-74 D A 0 16.8 3759 3769 188 6524 -11-74 D A 0 16.8 3759 3769 3759 3769 -11-74 D A 0 18.5 344 444 444 444 444 -04-74 N A 0 18.5 65 65 65 65 65 65 65 -04-74 N A 0 18.5 335 339 339 344 444 | -02-7 | z | | Ξ | 0. | | | | | | | | | | | | | 0 | 0 |
| -15-74 N F O 11.9 634 -16-74 N F O 11.9 634 -01-74 D A O 18.5 -05-74 D A O 18.5 -05-74 D A O 18.5 -11-74 D A O 18.5 -04-74 N A O 18.5 -04-74 N A O 18.5 -12-74 N A O 18.1 -12-74 N A O 18.1 -13-74 N A O 18.1 -13-74 N A O 18.1 -14-74 D B O 18.8 -15-74 N A O 18.1 -15-74 N A O 18.1 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.8 -17-74 D B O 18.9 -17-74 D D B O 18.9 -17-74 D D B O 18.9 -17-74 D D B O 18.9 -17-74 D D B O 18.9 -17-74 D D B O 18.9 -17-74 D D D D D D D D D D D D D D D D D D D | -15-74 N F O 11.9 634 -16-74 N F O 11.9 634 -01-74 D A O 18.2 -03-74 D A O 18.5 -05-74 D A O 18.5 -05-74 D A O 18.5 -05-74 D A O 18.8 -11-74 D A O 18.8 -11-74 D A O 18.8 -11-74 D A O 18.8 -05-74 D B O 18.8 -05-75 D D D D D D D D D D D D D D D D D D D | -15-7 | z | | Ξ | 6. | | | 952 | | | | | | | | | | 952 | 0 |
| -01-74 D A 0 +8.2 -8.8 -01-74 D A 0 +8.2 -8.8 -05-74 D A 0 +8.5 -18.8 -18.9 | 0-01-74 D A 0 18.2 -01-74 D A 0 18.2 -01-74 D A 0 18.5 -05-74 D A 0 18.5 -11-74 D A 0 16.8 -11-74 D A 0 16.8 -11-74 D A 0 16.8 -11-74 D A 0 16.8 -11-74 D A 0 16.8 -11-74 D A 0 16.8 -11-74 D A 0 16.8 -11-74 D A 0 18.2 -11-74 D A 0 18.2 -11-74 D A 0 18.2 -11-74 D A 0 18.2 -11-74 D B 0 18.8 -11-74 D B 0 18.8 -11-74 D B 0 18.8 -11-74 D B 0 18.8 -11-74 D B 0 18.8 -11-74 D B 0 18.9 -11-74 D B 0 | -15-7 | z | | | ෙ | | | 634 | | | | | | | | | | 634 | 0 |
| Oi - 74 D A O 18.2 288 9 Oi - 74 D A O 18.5 188 9 9 188 9 <td>Oji 74 D A O 18.2 288 288 189 188 189<!--</td--><td>-01-7</td><td>_</td><td></td><td>18</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0</td><td>484</td></td> | Oji 74 D A O 18.2 288 288 189 188 189 </td <td>-01-7</td> <td>_</td> <td></td> <td>18</td> <td></td> <td>0</td> <td>484</td> | -01-7 | _ | | 18 | | | | | | | | | | | | | | 0 | 484 |
| -05-74 D A 0 18.5 288 288 189 189 | -05-74 0 18.5 288 288 189 189 </td <td>-01-7</td> <td>0</td> <td></td> <td>18</td> <td></td> <td>0</td> <td>0</td> | -01-7 | 0 | | 18 | | | | | | | | | | | | | | 0 | 0 |
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| 1-11-74 D 4 6.254 391 6.254 2-11-74 D A 0 16.8 3759 3759 2-11-74 D A 0 16.8 3759 3759 2-2-74 D A 0 18.5 56 835 139 1629 -04-74 N A 0 18.5 556 835 139 1629 -12-74 N A 0 18.2 1392 835 139 1530 -12-74 N A 0 18.2 65 65 65 65 65 -12-74 N A 0 18.2 65 65 65 65 65 65 65 65 66 63 65 65 66 63 65 65 65 65 65 65 65 65 65 65 65 65 65 65 65 65 | 11-74 D A O 16.8 5668 195 391 629 26-74 D A O 16.8 3759 26-74 D A O 18.5 26-74 D A O 18.5 26-74 D A O 18.5 26-74 D A O 18.5 26-74 D A O 18.5 26-74 D A O 18.5 26-74 D A O 18.5 26-74 D A O 18.5 26-74 D A O 18.5 26-74 D A O 18.5 26-74 D A O 18.5 26-74 D A O 18.5 26-74 D A O 18.5 26-74 D B O 18.8 26-74 D B O 18.8 26-74 D B O 18.8 26-74 D B O 18.8 26-74 D B O 18.8 26-74 D B O 18.8 26-74 D B O 18.8 26-74 D B O 18.8 26-74 D B O 18.8 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 26-74 D B O 18.9 27-74 D D B O 18.9 27-74 D D B O 18.9 27-75 D D D D D D D D D D D D D D D D D D D | -05-7 | Q | | 18 | | | 188 | | | | | | | | | | | 188 | 0 |
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| 26-74 D A 0 17.0 516 516 1629 | 26-74 D A 0 17.0 516 517 | -11-7 | ۵ | | 16 | 8 | 759 | | | | | | | | | | | | 3759 | 123931 |
| 26-74 D A 0 17.0 516 517 | 26-74 D A 0 17.0 516 1629 <td>-26-7</td> <td>۵</td> <td></td> <td>11</td> <td>0</td> <td></td> <td>0</td> <td>52991</td> | -26-7 | ۵ | | 11 | 0 | | | | | | | | | | | | | 0 | 52991 |
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| -12-74 N A O 18.2 556 835 139 1530 | 12-74 N A O 18.2 556 835 139 1530 | -04-7 | z | | 18 | D. | | 3444 | | | | | | | | | | | 3444 | 2706 |
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| -11-74 D B 0 16.5 33769 -11-74 D B 0 16.5 3317 -26-74 D B 0 17.5 483 -26-74 D B 0 17.5 483 -04-74 N B 0 18.0 207 -04-74 N B 0 18.0 1743 -12-74 N B 0 1743 316 -12-74 N B 0 13.1 44 -25-74 N B 0 13.1 123 41 -25-74 N B 0 13.1 123 41 205 | -11-74 D B 0 16.5 33769 -11-74 D B 0 16.5 3317 -26-74 D B 0 17.5 483 -26-74 D B 0 17.5 483 -04-74 N B 0 18.0 207 -12-74 N B 0 18.0 1743 316 -12-74 N B 0 13.1 44 178 -25-74 N B 0 13.1 123 41 205 | -05-7 | ۵ | - | - | .2 | | 144 | | | | | | | | | | | 144 | 8532 |
| -11-74 D B 0 16.5 3317 -26-74 D B 0 17.5 483 -26-74 D B 0 17.5 483 -04-74 N B 0 18.0 207 -04-74 N B 0 18.0 951 475 -12-74 N B 0 18.0 974 1743 -25-74 N B 0 13.1 44 178 -25-74 N B 0 13.1 123 41 205 | -11-74 D B 0 16.5 3317 -26-74 D B 0 17.5 483 -26-74 D B 0 17.5 483 -04-74 N B 0 18.0 207 -04-74 N B 0 18.0 1743 316 -12-74 N B 0 18.0 1743 316 -12-74 N B 0 13.1 44 178 -25-74 N B 0 13.1 123 41 205 | -11-7 | ۵ | | _ | .5 3 | 69/ | | | | | | | | | | | | 3769 | 19457 |
| -26-74 D B O 17.5 322 -26-74 D B O 17.5 483 -26-74 D B O 17.5 483 -04-74 N B O 18.0 -04-74 N B O 18.0 -12-74 N B O 18.0 -12-74 N B O 13.1 -25-74 N B O 13.1 -25-75 N B O 13.1 -25-75 N B O 13.1 -25-75 N B O 13.1 -25-75 N B O 13.1 -25-75 N B O 13.1 -25-75 N B O 13.1 -25-75 N B O 13.1 -25-75 N B O 13.1 -25-75 N B O 13.1 -25-75 N B O 13.1 | -26-74 D B O 17.5 322 -26-74 D B O 17.5 483 -26-74 D B O 18.0 -04-74 N B O 18.0 -12-74 N B O 18.0 -12-74 N B O 18.0 -12-74 N B O 13.1 -25-74 N B O 13.1 -25-75 N B O 13.1 -25-75 N B O 13.1 -25-76 N B O 13.1 -25-77 N B O 13.1 -25-77 N B O 13.1 -25-77 N B O 13.1 -25-77 N B O 13.1 -25-77 N B O 13.1 -25-77 N B O 13.1 -25-77 N B O 13.1 -25-77 N B O 13.1 -25-75 N B O 13.1 -25-77 N B O 13.1 -25-77 N B O 13.1 -25-77 N B O 13.1 | -111-7 | a | | Ť | 5 | 317 | | | | | | | | | | | | 3317 | 7843 |
| -26-74 D B O 17.5 483 483 483 483 483 483 483 483 483 483 | -26-74 D B O 17.5 483 483 -26-74 D B O 18.0 625 -04-74 N B O 18.0 207 -12-74 N B O 18.0 951 475 -12-74 N B O 13.1 43 316 -25-74 N B O 13.1 123 41 205 | -26-7 | 0 | | _ | 'n. | 322 | | | | | | | | | | | | 322 | 5987 |
| -04-74 N B 0 18.0 625 625 625 625 625 625 625 625 625 625 | -04-74 N B O 18.0 625 625 625 625 625 625 625 625 625 625 | -26-7 | ۵ | | - | .5 | 483 | | | | | | | | | | | | 483 | 4692 |
| -04-74 N B O 18.0 . 207 . 207 . 207 | -04-74 N B O 18.0 - 207 - 207 - 12-74 N B O 18.0 951 475 - 12-74 N B O 18.0 1743 316 - 25-74 N B O 13.1 44 | -04-7 | z | | _ | | | 625 | | | | | | | | | | | 625 | 57083 |
| -12-74 N B O 18.0 951 475 1426 -12-74 N B O 18.0 1743 316 2059 -25-74 N B O 13.1 44 44 -25-74 N B O 13.1 123 41 205 | -12-74 N B O 18.0 951 475 1426 -12-74 N B O 18.0 1743 316 2059 -25-74 N B O 13.1 44 178 -25-74 N B O 13.1 123 41 205 | -04-7 | z | | _ | | | 207 | | | | | | | | | | | 207 | 43064 |
| 2059 -12-74 N B O 13.1 44 XX: 134 178 -25-74 N B O 13.1 123 41 XX: 41 205 | 2059 -12-74 N B O 13.1 44 XX: 134 178 -25-74 N B O 13.1 123 41 205 | -12-7 | z | | _ | 0. | 2 | 475 | | | | | | | | | | | 1426 | 0 |
| -25-74 N B O 13.1 44 XX: 134 178 -25-74 N B O 13.1 123 41 XX: 41 205 | -25-74 N B O 13.1 44 XX: 134 178 XX: 134 178 XX: 41 205 | -12-7 | z | | _ | 0. | 4 | 316 | | | | | | | | | | | 2059 | 0 |
| -25-74 N B O 13.1 123 41 205 | -25-74 N B O 13.1 123 41 205 | -25-7 | z | | - | | | 44 | | | | | | | | | Ŷ | | 178 | 234458 |
| | | -25-7 | z | | _ | - | 7 | 4 | | | | | | | | | Ŷ | | 205 | 354872 |

Appendix 7. Continued.

| Total Date Di Sta Dpt C AL SP SM YP TP JD CP BR SS NS FS Misc. Larvae C C C C C C C C C | at | | | | | | | | | | | | | | | | | |
|---|-----------|------------|---------------|----------------|------|-------|----|-----|-----|---|----|----|----|----|----|-------|----------------------|--------|
| 01-74 D F 0 18.6 | | ند | ٥ | Temp | AL | SP | SM | γp | 1.0 | 9 | CP | BR | SS | SN | FS | Misc. | Total Larvae | Eggs |
| 01-74 D F 0 18 D F 0 18 D F 0 18 D F 0 18 D F 0 18 D F 0 18 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 17 S 595 D F 0 18 D F | | . | | 1 | | | | | | | | | | | | | С | 0 |
| 70-7-4 D F 0 17-5 595 70-7-4 D F 0 17-5 595 70-7-4 D F 0 17-5 595 70-7-4 D F 0 17-5 595 70-7-4 D F 0 17-5 595 70-7-4 D F 0 17-5 595 70-7-4 D F 0 17-5 595 70-7-4 D F 0 17-5 595 70-7-4 D F 0 17-5 595 70-7-4 D F 0 17-5 595 70-7-4 D F 0 17-5 595 70-7-4 D F 0 18-0 10-45 70-7-4 D A 0 22-5 680 70-7-4 D A 0 22-5 680 70-7-4 D A 0 22-5 680 70-7-4 D A 0 22-5 680 70-7-4 D A 0 22-5 680 70-7-4 D A 0 22-5 142 70-7-4 D A 0 22-5 142 70-7-4 D A 0 22-5 142 70-7-4 D A 0 22-5 142 70-7-4 D A 0 18-5 19-5 19-5 70-7-4 D A 0 18-5 19-5 19-5 70-7-4 D B 0 22-0 19-8 70-7-4 D B 0 22-0 19-8 70-7-4 D B 0 22-0 19-8 70-7-4 D B 0 22-0 19-8 70-7-4 D B 0 22-0 19-8 70-7-4 D B 0 12-0 19-8 70-7-4 D B 0 18-5 19-8 70-7-4 D | -01-7 | L L | > (| • | 101 | | | | | | | | | | | | 107 | 430 |
| 767-74 D F 0 17-5 767-74 D F 0 17-5 767-74 D F 0 17-5 767-74 D F 0 17-5 767-74 D F 0 17-5 767-74 D F 0 17-5 767-74 D F 0 17-5 767-74 D F 0 17-5 767-74 D F 0 17-5 767-74 D F 0 17-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D A 0 12-5 767-74 D B 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D 0 12-5 767-74 D | -01-1 | | > (| | 2 | | | | | | | | | | | | C | 3023 |
| 767-74 D F 0 17.5 595 -117-74 D F 0 17.5 595 -267-74 D F 0 17.5 56 -267-74 D F 0 16.3 641 -047-74 N F 0 18.0 540 -127-74 N F 0 18.0 145 -257-74 N R 0 22.5 142 -277-74 D A 0 22.5 142 -277-74 D A 0 22.5 142 -277-74 D A 0 22.5 142 -277-74 D A 0 22.5 143 -277-74 D A 0 18.5 188 -277-74 D B 0 22.0 1436 -177-74 D B 0 24.0 1436 -177-74 D B 0 24.0 1436 -177-74 D B 0 16.9 1436 -177-74 D B 0 16.9 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 1439 -177-74 D B 0 17.0 | 7-60- | _ | o | | | | | | | | | | | | | | · c | 2373 |
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| -11-74 U B 0 16.9 128 -24-74 D B 0 16.9 128 -08-74 N B 0 24.0 7225 141 -08-74 N B 0 24.0 7367 282 -11-74 N B 0 21.0 978 12251 -11-74 N B 0 21.0 978 1227 -16-74 N B 0 18.5 1082 540 -16-74 N B 0 18.5 2219 1585 -22-74 N B 0 15.9 1409 7052 | 7 | ه ه | 0 | v c | | | | | | | | | | | | | 0 | 1820 |
| -24-74 D B 0 16.9 125 -24-74 D B 0 16.9 7225 141 -08-74 N B 0 24.0 7367 282 -11-74 N B 0 21.0 978 12251 -11-74 N B 0 21.0 978 1227 -16-74 N B 0 18.5 1082 540 -16-74 N B 0 18.5 2219 1585 -22-74 N B 0 15.9 1409 7052 | | ه ه | 0 | | c | | | | | | | | | | | | 128 | 0 |
| -24-74 N B O 24.0 7225 141 -08-74 N B O 24.0 7367 282 -11-74 N B O 21.0 978 12251 -11-74 N B O 21.0 833 11227 -16-74 N B O 18.5 1082 540 -16-74 N B O 18.5 2219 1585 -22-74 N B O 15.9 1409 7052 | 1-57- | 0 0 | 0 | 0 (| V | | | | | | | | | | | | 0 | 0 |
| -08-74 N B 0 24.0 7253 141 -08-74 N B 0 24.0 7367 282 -11-74 N B 0 21.0 873 11227 -16-74 N B 0 18.5 2219 1585 -16-74 N B 0 18.9 529 5465 -22-74 N B 0 15.9 1409 7052 | 1 5 6 7 1 | ۵ ۵ | > 0 | | c | * * * | | | | | | | | | | | 7366 | 0 |
| -08-74 N B 0 24.0 7367 262 -11-74 N B 0 21.0 978 12251 -16-74 N B 0 18.5 1082 540 -16-74 N B 0 18.5 2219 1585 -22-74 N B 0 15.9 1409 7052 | 7-80- | ם מ | > (| | v | - 0 | | | | | | | | | | | 7649 | 0 |
| -11-74 N B O 21.0 978 12251 -11-74 N B O 21.0 833 11227 -16-74 N B O 18.5 1082 540 -16-74 N B O 18.5 2219 1585 -22-74 N B O 15.9 1409 7052 | 7-80- | ם מ | > (| . . | n (| 707 | | | | | | | | | | | 13229 | 2450 |
| -11-74 N B O 21.0 833 11227 -16-74 N B O 18.5 1082 540 -16-74 N B O 18.5 2219 1585 -22-74 N B O 15.9 1409 7052 | -11-7 | 20 | ٥, | _ | 8/6 | 12221 | | | | | | | | | | | 12060 | 4898 |
| -16-74 N B O 18.5 1082 540 -16-74 N B O 18.5 2219 1585 -22-74 N B O 15.9 1409 7052 | -11-7 | 82 | 0 | _ | œ | 11227 | | | | | | | | | | | 4622 | |
| -16-74 N B O 18 5 2219 1585 -22-74 N B O 15 9 529 5465 -22-74 N B O 15 9 1409 7052 | -16-7 | 8 | 0 | ω | 0 | 540 | | | | | | | | | | | 7000 | 763 |
| -22-74 N B O 15.9 529 5465 -22-74 N B O 15.9 1409 7052 | -16-7 | 8 | 0 | დ | 7 | 1585 | | | | | | | | | | | 3000 4000 4000 | 100 |
| -22-74 N B O 15.9 1409 7052 | -22-7 | 8 | 0 | 'n. | 529 | 5465 | | | | | | | | | | | 7000 | |
| CO. C. C. C. C. T. Y. | -22-7 | 8 | 0 | ري ري | 1409 | 7052 | | | | | | | | | | | 8401 | ر |

Appendix 7. Continued.

| Date D1 Sta Dp1 7-08-74 D F 0 7-08-74 D F 0 7-17-74 D F 0 | Temp | | | | | | | | | | | | | | |
|---|------|--------------|----------|-----|----|-----|------|----|----|----|----|----|-------|---------|------|
| -08-74 D F -08-74 D F -17-74 D F -17-74 D F -24-74 D F | t c. | AL | SP | NS. | γÞ | 1.0 | . ab | СР | BR | SS | NS | FS | Misc. | Total | Eggs |
| -08-74 D F -17-74 D F -17-74 D F -24-74 D F | 24.0 | 1383 | 138 | | | | | | | | | | | | |
| -17-74 0 F -17-74 0 F -24-74 0 F | 24.0 | 830 | 1 | | | | | | | | | | | 1521 | 277 |
| -17-74 D F -24-74 D F -24-74 D F | 20.2 | 625 | | | | | | | | | | | | 830 | 0 |
| -24-74 D F | 20.2 | 296 | 148 | | | | | | | | | | | 625 | 3958 |
| -21-71 D E | 18.0 |) |) | | | | | | | | | | | 444 | 2222 |
| | 18.0 | | | | | | | | | | | | | 0 | 909 |
| -17-74 N F | 0.61 | 1408 | 7049 | | | | | | | | | | | 0 | 0 |
| -17-74 N F | 0 0 | 1260 | 7 6 7 | | | | | | | | | | | 8457 | 7692 |
| -22-74 N F | 9 | 95.4 | 1 0 | | | | | | | | | | | 6174 | 4410 |
| -22-74 N F | | | 330 | | | | | | | | | | | 1901 | |
| : | | 60- | 26 | | | | | | | | | | | 555 | C |
| -06-74 D A | 2 | | | | | | | ٠. | | | | | | |) |
| -06-74 D A | | | | | | | | | | | | | | 0 | 0 |
| -14-74 D A | 0 | 01.8 | | | | | | | | | | | | 0 | 0 |
| 8-14-74 D A O | | 12.15 | | | | | | | | | | | | 8 10 | 270 |
| -19-74 D A | 4 |) : | | | | | | | | | | | | 1215 | 405 |
| -19-74 D A | 4 | | | | | | | | | | | | | 0 | 0 |
| -05-74 N A | თ | | 207 | | | | | | | | | | | 135 | 0 |
| -05-74 N A | 6 | |) | | | | | | | | | | | 1036 | 207 |
| -14-74 N A | 7 | 206 | 827 | | | | | | | | | | | 829 | 0 |
| -14-74 N A | 7 | | 1343 | | | | | | | | | | | 1033 | 103 |
| -19-74 N A | ď | | 109 | | | | | | | | | | | 1549 | 0 |
| -19-74 N A | 22.0 | | 982 | | | | | | | | | | | 327 | 0 |
| a u V2-90- | c | | | | | | | | | | | | | 1601 | 0 |
| -06-74 | V (| | | | | | | | | | | | | c | (|
| -14-74 D B | N 0 | | 0 | | | | | | | | | | |) C | 0 0 |
| -14-74 D B | | | 05- | | | | | | | | | | | 130 |) C |
| -19-74 D B | D 5 | | | | | | | | | | | | | | 0 |
| -19-74 n B | | | | | | | | | | | | | | 0 | · C |
| -05-74 N R | Ισ | 100 | • | | | | | | | | | | | 0 | · C |
| 8-05-74 N B O | 7 61 | 767 | - 00 | | | | | | | | | | | 762 | 383 |
| -14-74 N B | . ~ | " | 9709 | | | | | | | | | | | 764 | 0 |
| -14-74 N B | | 15.5 15.3 | 2020 | | | | | | | | | | | 5403 | 0 |
| -19-74 N B | | • | 2407 | | | | | | | | | | | 6588 | 0 |
| -19-74 N B | | • | 1000 | | | | | | | | | | | 2701 | 135 |
| | | 577 | 263/ | | | | | | | | | | | 1 B C 4 | 3 |

Appendix 7. Continued.

Appendix 7. Continued.

| Sample | ۵. | arameter | ers | | | | | S | Species/Groups | /Group | SC | | | | | | |
|--|----------|-----------|---|----|----|-----|----|-----|----------------|--------|----|----|----|----|-------|-----------------|-----------|
| Date D1 | Sta | Dpt | Temp C | AL | SP | NS. | ΥP | 1 6 | 9 | CP | BR | SS | S. | FS | Misc. | Total Larvae | Eggs |
| 10-09-74 D | ш. | 00 | 14.0 | | | | | · | | | | | | | | 00 | 00 |
| -74 | | 00 | 9.9 | | | | | | | | | | | | | 00 | 00 |
| 11-26-74 D 11-26-74 D 11-26-74 N 11-26-74 N | 4444 | 0000 | 5.5 5.5 4.7 | | | | | | | | | | | | | 0000 | 0000 |
| 11-26-74 D 11-26-74 D 11-26-74 N 11-26-74 N | 8888 | 0000 | 5.2 5.0 5.0 | | | | | | | | | | | | | 0000 | 0000 |
| 11-26-74 D 11-26-74 D 11-26-74 D 11-26-74 D | F F F F | 0000 | я 5000 0.00 | | | | | | | | | | | | | 0000 | 0 0 141 0 |
| 4-17-74 0 4-17-74 0 4-17-74 0 4-17-74 0 4-17-74 0 17-74 0 17-74 0 17-74 | 00000000 | 00400040 | 8 C C C C C C C C C C C C C C C C C C C | | | | | | | | | | | | | | 0000000 |
| - 17 - 74 - 17 - 74 - 17 - 74 - 17 - 74 - 16 - 74 - 16 - 74 | | 004080044 | | | | | | | | | | | | | | 00000000 | 00000000 |
| - 16-74 | | σω | | | | | | | | | | | | | | 00 | 00 |

Appendix 7. Continued.

| AL SP SM YP TP 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | ⊢ | an an an an an an an an an an an an an a | SS | S S | M is O | Total Larvae 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Eggs 00000000000000000000000000000000000 |
|--|----------|--|----|-----|--------------|--|--|
| -16-74 D G O 8.8 -16-74 D G O 0 8.8 -16-74 D G G 2 7.4 -16-74 D G G 2 7.4 -16-74 N G D G G 7.4 -16-74 N G D G G 7.6 -16-74 N G D 7.0 -16-74 N G D 7.0 -16-74 N H G 7.0 -16-74 N H G 7.0 -16-74 N H G 6.4 -16-74 N H G 6.4 -16-74 N H G 6.4 -16-74 N H G 6.4 -16-74 N H G 6.4 -16-74 N H G G 9.5 -13-74 D C O 9.5 -13-74 D C O 9.5 -13-74 D C O 9.5 -13-74 D C G 9.1 -14-74 N C C 2 8.8 -14-74 N C C 2 9.1 -14-74 N C G 8.8 -13-74 D D G G 9.0 -13-74 D D G G 9.0 -13-74 D D G G 9.0 -13-74 D D G G 9.0 -13-74 D D G G 9.0 -13-74 D D G G 9.0 -13-74 D D G G 9.0 -13-74 D D G G 9.0 | | | | | | 0000000 00000 | 0000000 000000 |
| -16-74 D G G 2 7.4 -16-74 D G G 2 7.4 -16-74 D G G 6 7.4 -16-74 N G G 6 7.4 -16-74 N G G 7.4 -16-74 N G G 7.6 -16-74 N G G 7.0 -16-74 D H G 7.0 -16-74 D H G 7.0 -16-74 D H G 7.0 -16-74 D H G 7.0 -16-74 D H G 7.0 -16-74 D H G 7.0 -16-74 D H G 6.4 -16-74 D H G 7.0 -16-74 D H G 6.4 -16-74 N H G G.4 -16-74 N H G G.4 -16-74 N H G G.4 -16-74 N H G G.4 -13-74 D C C G 9.1 -13-74 D C C G 9.1 -13-74 D C C G 9.1 -13-74 D C G 9.2 -13-74 D C G 9.2 -13-74 D D G G 9.0 -13-74 D D G G 9.0 -13-74 D D G G 9.0 -13-74 D D G G 9.0 -13-74 D D G G 9.0 -13-74 D D G G 9.0 | | | | | | 0000000 00000 | 0000000 0000000 |
| -16-74 D G G 7.4 -16-74 N G G 6 7.4 -16-74 N G G 7.4 -16-74 N G G 7.4 -16-74 N G G 7.6 -16-74 N G G 7.0 -16-74 D H G 7.0 -16-74 D H G 7.0 -16-74 D H G 7.0 -16-74 D H G 7.0 -16-74 D H G 7.0 -16-74 D H G 7.0 -16-74 D H G 7.0 -16-74 N H G G.4 -16-74 N H G G.4 -16-74 N H G G.4 -16-74 N H G G.4 -16-74 N H G G.4 -16-74 N H G G.4 -16-74 N C G 9.1 -13-74 D C G 9.1 -13-74 D C G 9.1 -13-74 D C G 9.2 -13-74 D C G 9.2 -13-74 D C G 9.2 -13-74 D C G 9.2 -13-74 D D G 9.0 -13-74 D D G 9.0 -13-74 D D G 9.0 | | | | | | 000000 00000 | |
| -16-74 N G G 7.4 -16-74 N G G 2 7.6 -16-74 N G G 2 7.6 -16-74 N G G 2 7.6 -16-74 N G G 2 7.6 -16-74 D H G 7.0 -16-74 D H G 7.0 -16-74 D H G 7.0 -16-74 N H G 6.4 -16-74 N H G 6.4 -16-74 N H G 6.4 -16-74 N H G 6.4 -16-74 N H G 6.4 -16-74 N H G 6.4 -16-74 N H G 6.4 -16-74 N H G 6.4 -16-74 N H G 6.9.1 -13-74 D C G 9.1 -13-74 D C G 9.1 -13-74 D C G 9.1 -13-74 D C G 9.2 -13-74 D C G 9.2 -13-74 N C G 8.8 -13-74 N C G 8.8 -13-74 N C G 9.0 -13-74 N C G 9.0 -13-74 N C G 9.0 -13-74 N C G 9.0 | | | | | | 00000 00000 | 00000 000000 |
| -16-74 N G O B.O16-74 N G O B.O16-74 N G O B.O16-74 N G O T.O16-74 D H O T.O16-74 D H O T.O16-74 D H G T.O16-74 D H B T.O16-74 D H B T.O16-74 N H O T.O16-74 N H G G.4 -16-74 N H G G.9 -17-74 N H G G.9 -13-74 D C O 9.5 -13-74 D C O 9.5 -13-74 D C O 9.5 -13-74 D C O 9.2 -14-74 N C C O 9.2 -14-74 N C G G B.B -14-74 N C G G B.B -13-74 D D O 9.2 -13-74 D D O 9.2 -13-74 D D O 9.2 -13-74 D D O 9.2 -13-74 D D O 9.3 -13-74 D D O 9.3 | | | | | | 0000 00000 | 0000 0000000 |
| -16-74 N G C C C C C C C C C C C C C C C C C C | | | | | | | 000 000000 |
| -16-74 N G 4 7.6 -16-74 N G 6 7.6 -16-74 N G 6 7.6 -16-74 D H 2 7.0 -16-74 D H 2 7.0 -16-74 D H 8 7.0 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -17-74 N C 2 8.8 -13-74 D C 6 9.1 -13-74 D C 6 9.0 -13-74 D D 6 9.0 -13-74 D D 9 9.2 -13-74 D D 9 9.0 -13-74 D D 9 9.0 | | | | | | 00 00000 | 00 000000 |
| -16-74 N G G 7.6 -16-74 N G G 7.6 -16-74 D H 2 7.0 -16-74 D H 6 7.0 -16-74 D H 6 7.0 -16-74 N H 2 6.4 -16-74 N H 2 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 9.1 -13-74 D C 2 9.1 -13-74 D C 2 9.1 -13-74 D C 6 9.1 -13-74 D C 6 9.1 -13-74 D C 6 9.1 -13-74 D C 6 9.0 -13-74 D D 6 9.0 -13-74 D D 6 9.0 -13-74 D D 6 9.0 -13-74 N D 0 9.3 | | | | | | 0 00000 | 0 000000 |
| -16-74 D H O 7.0 -16-74 D H 2 7.0 -16-74 D H 2 7.0 -16-74 D H 6 7.0 -16-74 D H 8 7.0 -16-74 N H 0 7.9 -16-74 N H 2 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 9.1 -13-74 D C 0 9.5 -13-74 D C 0 9.5 -13-74 D C 2 9.1 -13-74 D C 6 9.1 -13-74 D C 6 9.1 -13-74 D C 6 9.1 -13-74 D C 6 9.1 -13-74 D C 6 9.1 -13-74 D C 6 9.0 -13-74 D D 9.2 -13-74 D D 9.9 -13-74 D D 9.9 -13-74 D D 9.9 -13-74 D D 6 9.0 -13-74 N D 9 9.3 | | | | | | 00000 | 000000 |
| -16-74 D H 2 7.0 -16-74 D H 6 7.0 -16-74 D H 6 7.0 -16-74 D H 8 7.0 -16-74 N H 0 7.9 -16-74 N H 2 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -13-74 D C 0 9.5 -13-74 D C 2 9.1 -13-74 D C 2 9.1 -13-74 D C 2 8.8 -14-74 N C 2 8.8 -14-74 N C 6 9.2 -14-74 N C 9 9.2 -13-74 D D 9 9.2 -13-74 D D 9 9.2 -13-74 D D 9 9.0 -13-74 D 0 9 9.0 | | | | | | 0000 | 00000 |
| -16-74 D H | | | | | | 000 | 00000 |
| -16-74 D H 6 7.0 -16-74 N H 0 7.9 -16-74 N H 2 6.4 -16-74 N H 2 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -13-74 D C 0 9.5 -13-74 D C 2 9.1 -13-74 D C 2 9.1 -13-74 D C 2 9.1 -13-74 D C 6 9.1 -14-74 N C 2 8.8 -14-74 N C 6 8.8 -14-74 N C 6 8.8 -13-74 D D 0 9.2 -13-74 D D 0 9.2 -13-74 D D 0 9.2 -13-74 D D 0 9.2 -13-74 D D 0 9.2 | | | | | | 00 | |
| -16-74 D H 6 7.0 -16-74 N H 0 7.9 -16-74 N H 2 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -13-74 D C 0 9.5 -13-74 D C 2 9.1 -13-74 N C 9 9.2 -13-74 D C 9 9.2 -13-74 D C 6 9.1 -14-74 N C 2 8.8 -14-74 N C 6 8.8 -13-74 D D 0 9.2 -13-74 N D 0 9.2 | | | | | | 00 | 0000 |
| -16-74 D H 8 7.0 -16-74 N H 0 7.9 -16-74 N H 2 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -13-74 D C 0 9.5 -13-74 D C 2 9.1 -13-74 D C 2 9.1 -13-74 N C 0 9.2 -14-74 N C 0 9.2 -14-74 N C 6 8.8 -14-74 N C 6 8.8 -14-74 N C 6 8.8 -13-74 D D 0 9.2 -13-74 D D 0 9.2 -13-74 D D 0 9.2 -13-74 N D 0 9.2 | · | | | | | > | 000 |
| - 16-74 N H O 7.9 - 16-74 N H 2 6.4 - 16-74 N H 2 6.4 - 16-74 N H 6 6.4 - 16-74 N H 6 6.4 - 13-74 D C 0 9.5 - 13-74 D C 2 9.1 - 13-74 D C 2 9.1 - 13-74 D C 2 8.8 - 14-74 N C 0 9.2 - 14-74 N C 0 9.2 - 13-74 D D 0 9.2 - 13-74 D D 0 9.2 - 13-74 D D 0 9.2 - 13-74 D D 0 9.2 - 13-74 D D 0 9.2 - 13-74 D D 0 9.2 - 13-74 D D 0 9.3 - 13-74 D D 0 9.3 | · | | | | | . (| 0 |
| -16-74 N H 2 6.4 -16-74 N H 4 6.4 -16-74 N H 6 6.4 -16-74 N H 6 6.4 -13-74 D C 0 9.5 -13-74 D C 2 9.1 -13-74 D C 2 9.1 -14-74 N C 2 8.8 -14-74 N C 2 8.8 -14-74 N C 6 8.8 -14-74 N C 6 8.8 -13-74 D D 0 9.2 -13-74 D D 0 9.2 -13-74 D D 0 9.2 -13-74 D D 0 9.2 -13-74 D D 0 9.2 | · | | | | | 0 | 0 |
| -16-74 N H | | | | | | 0 | |
| -16-74 N H 6 6.4 -13-74 D C 0 9.5 -13-74 D C 2 9.1 -13-74 D C 2 9.1 -13-74 D C 2 9.1 -14-74 N C 0 9.2 -14-74 N C 2 8.8 -14-74 N C 2 8.8 -14-74 N C 2 8.8 -14-74 D D 0 9.2 -13-74 D D 0 9.2 -13-74 D D 0 9.2 -13-74 D D 6 9.0 -13-74 N D 0 9.3 | | | | | | 0 | 0 |
| -16-74 N H B 6.4 -13-74 D C 0 9.5 -13-74 D C 2 9.1 -13-74 D C 2 9.1 -13-74 N C 9 9.2 -14-74 N C 2 8.8 -14-74 N C 2 8.8 -14-74 N C 6 8.8 -14-74 D D 0 9.2 -13-74 D D 0 9.2 -13-74 D D 6 9.0 -13-74 D D 6 9.0 | | | | | | 0 | 0 |
| -13-74 D C 0 9.5 -13-74 D C 2 9.1 -13-74 D C 6 9.1 -14-74 N C 0 9.2 -14-74 N C 2 8.8 -14-74 N C 4 8.8 -14-74 N C 6 8.8 -13-74 D D 0 9.2 -13-74 D D 0 9.2 -13-74 D D 6 9.0 -13-74 N D 0 9.3 | | | | | | 0 | 0 |
| -13-74 D C O 9.5 -13-74 D C 2 9.1 -13-74 D C 2 9.1 -14-74 N C O 9.2 -14-74 N C 2 8.8 -14-74 N C 4 8.8 -14-74 N C 6 8.8 -13-74 D D O 9.2 -13-74 D D O 9.2 -13-74 D D 6 9.0 -13-74 N D O 9.3 | | | | | | Ċ. | (|
| -13-74 D C 2 9.1 -13-74 D C 4 9.1 -13-74 D C 6 9.1 -14-74 N C 0 9.2 -14-74 N C 2 8.8 -14-74 N C 6 8.8 -13-74 D D 0 9.2 -13-74 D D 0 9.2 -13-74 D D 6 9.0 -13-74 D D 6 9.0 -13-74 N D 0 9.3 | | | | | | 308 | > (|
| -13-74 D C 4 9.1 -13-74 D C 6 9.1 -14-74 N C 2 8.8 -14-74 N C 2 8.8 -14-74 N C 6 8.8 -13-74 D D 9.2 -13-74 D D 9.2 -13-74 D D 9.0 -13-74 D D 6 9.0 -13-74 N D 9.0 -13-74 N D 9.0 | | | | | | 232 | 0 (|
| -13-74 D C 6 9.1 -14-74 N C 0 9.2 -14-74 N C 2 8.8 -14-74 N C 4 8.8 -14-74 N C 6 8.8 -13-74 D D 0 9.2 -13-74 D D 2 9.0 -13-74 D D 6 9.0 -13-74 N D 0 9.3 | | | | | | 52 | 0 |
| -14-74 N C O 9.2 -14-74 N C 2 8.8 -14-74 N C 4 8.8 -14-74 N C 6 8.8 -13-74 D D O 9.2 -13-74 D D 2 9.0 -13-74 D D 6 9.0 -13-74 D D 6 9.0 -13-74 N D 0 9.3 | | | | | | 127 | 0 (|
| -14-74 N C 2 8.8 -14-74 N C 4 8.8 -14-74 N C 6 8.8 -13-74 D D 0 9.2 -13-74 D D 4 9.0 -13-74 D D 6 9.0 -13-74 N D 0 9.3 | | | | | | 5 | O |
| -14-74 N C 4 8.8 -14-74 N C 6 8.8 -13-74 D D 0 9.2 -13-74 D D 4 9.0 -13-74 D D 6 9.0 -13-74 N D 0 9.3 -13-74 N D 0 9.3 | | | | | | 324 | 0 |
| -14-74 N C 6 8.8 -13-74 D D 0 9.2 -13-74 D D 2 9.0 -13-74 D D 6 9.0 -13-74 D D 6 9.0 -13-74 N D 0 9.3 | | | | | | 247 | 0 |
| -13-74 D D O 9.2 -13-74 D D 2 9.0 -13-74 D D 4 9.0 -13-74 D D 6 9.0 -13-74 N D 0 9.3 | | | | | | 37.1 | 0 |
| -13-74 D D 2 9.0 -13-74 D D 4 9.0 -13-74 D D 6 9.0 -13-74 D D 8 9.0 -13-74 N D 0 9.3 | | | | | | 0 | 0 |
| -13-74 D D 4 9.0 -13-74 D D 6 9.0 -13-74 D D 8 9.0 -13-74 N D 0 9.3 | | | | | | 53 | 0 |
| -13-74 D D 6 9.0 -13-74 D D 8 9.0 -13-74 N D 0 9.3 | | | | | | 0 | 0 |
| -13-74 D D 8 9.0 -13-74 N D 0 9.3 | | | | | | 185 | 0 |
| -13-74 N D O 9.3 | | | | | | 199 | 0 |
| -13-74 N U O 3.3 | | | | | | 2 - 5 | C |
| | | | | | | 2.0 | o c |
| -13-74 N D 2 8.4 | | | | | | 7.40 | 0 |
| -13-74 N D 4 8.4 | | | | | | 067 | > (|
| -13-74 N D 6 8.4 | | | | | | 183 | 0 |
| -13-74 N D 8 8.4 | | | | | | 144 | 0 |

Appendix 7. Continued.

| Sampl | l o | Para | arameter | ers | | | | | Sp | Species/Groups | 'Group | Ñ | | | | | | |
|---------|-----|------|----------|------|-------|-----|-----|------|----|----------------|--------|----|------|----|----|-------|-----------------|------|
| Date | 10 | Sta | Dpt | Temp | AL | SP | SM | ΥР | 41 | D, | GP | BR | \$\$ | NS | FS | Misc. | Total Larvae | Eggs |
| 1 | | , | | 5 | | | | | | | | | | | | | _ c | |
| 5-14-74 | ے د | 5 C | ۰ د | 5 5 | | | | | | | | | | | | | 0 | 0 |
| - 14-7 | · C | , c | 1 4 | 10. | | | 63 | | | | | | | | | | 63 | 0 |
| - 14-7 | ۵ | | . 0 | 10.1 | | | 144 | | | | | | | | | | 144 | 0 |
| -13-7 | z | G | 0 | 8.6 | | | 20 | | | | | | | | | | 50 | 0 |
| -13-7 | z | 9 | 7 | 9.3 | | | 110 | | | | | | | | | | 110 | 0 |
| -13-7 | z | G | 4 | 6.3 | | | 688 | | | | | | | | | | 688 | 0 |
| -13-7 | z | ပ | 9 | 6.9 | | | 51 | | | | | | | | | | 51 | 0 |
| -14-7 | _ | I | c | | | | | | | | | | | | | | 0 | 0 |
| - 14-7 | ے د | : 1 | , | | | | | | | | | | | | | | 0 | 0 |
| 5-14-74 | ۵ ۵ | Ξ | 1 4 | . o | | | 157 | | | | | | | | | | 157 | 0 |
| -14-7 | ۵ ۵ | Ξ | 9 | | | | 154 | | | | | | | | | | 154 | C |
| -14-7 | ٥ | Ξ | 8 | | | | 83 | | | | | | | | | | 83 | 0 |
| -13-7 | z | I | 0 | | | | | | | | | | | | | | 0 | 0 |
| -13-7 | z | I | 7 | | | | 226 | | | | | | | | | | 226 | 0 |
| -13-7 | z | I | 4 | | | | | | | | | | | | | | 0 | 0 |
| -13-7 | z | I | 9 | | | | 135 | | | | | | | | | | 135 | 0 |
| -13-7 | z | I | œ | • | | | 135 | | | | | | | | | | 135 | 0 |
| - 12-7 | _ | ر | c | 7 | 49 | | | | | | | | | | | | 49 | 0 |
| - 12-7 | o C | ى د | , | | 4733 | | | 182 | | | | | | | | | 4915 | 0 |
| 6-12-74 | ۵ ۵ | , ပ | 1 4 | 17.6 | 1023 | | | | | | | | | | | | 1023 | 0 |
| -12-7 | ٥ | ပ | 9 | 9 | 120 | | | | | | | | | | | | 120 | 0 |
| -12-7 | z | ပ | 0 | 4 | | 416 | | 938 | | | | | | | | | 5522 | 1042 |
| -12-7 | z | ပ | 7 | • | 5212 | 91 | | | | | | | | | | | 5303 | 558 |
| -12-7 | z | ပ | 4 | 4. | ω, | 91 | | 91 | | | | | | | | | 6139 | 578 |
| -12-7 | z | ပ | 9 | 4 | ω, | 23 | | 20 | | | | | | | | | 7642 | 439 |
| - 12-7 | | ٥ | 0 | | | • | | | | | | | | | | | 0 | 0 |
| -12-7 | | ۵ | 7 | | 2 100 | | | 89 | | | | | | | | | 2168 | 0 |
| -12-7 | | 0 | 4 | | 1250 | | | | | | | | | | | | 1250 | 0 |
| -12-7 | | ۵ | 9 | | 840 | | | 26 | | | | | | | | | 896 | 0 |
| -12-7 | | ٥ | 8 | ß | 949 | | | | | | | | | | | | 949 | 219 |
| -12-7 | | ٥ | 0 | 4 | 2597 | | | 611 | | | | | | | | | 3208 | 6569 |
| -12-7 | | ۵ | 7 | 4 | 4718 | | | 421 | | | | | | | | | 5139 | 858 |
| 6-12-74 | z | 0 | 4 | 14.1 | 3877 | 29 | | 135 | | | | | | | | | 4019 | 352 |
| -12-7 | | ٥ | 9 | 4 | 2609 | | | | | | | | | | | | 2609 | 1683 |
| -12-7 | | ٥ | æ | 4 | 4636 | | | | | | | | | | | | 4636 | 927 |
| | | | | | | | | | | | | | | | | | | |

Appendix 7. Continued.

| Sample | 0 | Para | arameter | ers | | | | | Sp | Species/Groups | Groups | | | | | | | |
|----------------------------|-----|----------------|--------------|--------------|--------------|------|----|------|-----|----------------|--------|----|----|-------|----|-------|-----------------|---------------|
| Date | 10 | Sta | Dpt | Temp | AL | SP | SM | γb | 1.0 | 9 | CP | BR | 88 | NS NS | FS | Misc. | Total Larvae | Eggs |
| -12-7 | ٥ | ш | 0 | | | | | | | | | | | | | | 0 | 0 |
| -12-7 | ٥ | ш | 8 | ıc. | | | | | | | | | | | | | 0 6 | 00 |
| 6-12-74 6-12-74 | ۵۵ | шш | 14 | 12.8 12.8 | 100 37 | | | | | | | | | | | | 37 | 00 |
| -11-7 | ٥ | ဖ | 0 | | 581 | | | 125 | | | | | | | | | 106 | 0 |
| -11-7 | ۵ | G | 7 | 5 | 1644 | | | 42 | | | | | | | | | 1686 | 0 0 |
| -11-7 | ٥ | g | 4 | ر ا | 1719 | | | 52 | | | | | | | | | 1//1 | > C |
| -11-7 | ۵ 2 | o 0 | <u>ဖ</u> င | • | 1051 | | | 68 E | | | | | | | | | 5506 | 0 |
| -11-7 | zz | 9 O | 0 | . 4 | 1053 | 54 | | | | | | | | | | | 1107 | 333 |
| 6-11-74 | z | | 4 (| 14.5 | 946 | | | | | | | | | | | | 946 2881 | 0 |
| 1-11- | z | 5 | ٥ | 1 | 7007 | | | į | | | | | | | | | 7.7 | c |
| -11-7 | ۵ د | I | 0 (| 4 4 | 473 | | | 176 | | | | | | | | | 629 | 237 |
| -111-7 | 2 6 | r I | 7 4 | | 1008 | | | 2 | | | | | | | | | 1008 | 0 |
| -11-7 | ۵ ۵ | I | 9 | . 4 | 3094 | | | 38 | | | | | | | | | 3132 | 80 |
| -11-7 | ۵ | 1 | α) | D. | 1618 | | | | | | | | | | | | 1618 | 0 5 |
| -11-7 | z | I | 0 | ю | 1251 | | | 135 | | | | | | | | | 1386 | D + |
| -11-7 | Z: | Ι: | ۸ ، | 4. | 3838 | | | 112 | | | | | | | | | 3950 4053 | <u>+</u> C |
| 6 - 11 - 74 6 - 11 - 74 | z z | I I | 4 G | 4 4 6 6 | 4053 3253 | | | 68 | | | | | | | | | 3342 | 0 |
| -11-7 | z | = | & | 4 | 3555 | | | ļ | | | | | | | | | 3555 | 0 |
| 7-60- | _ | Ċ | c | Ľ | 290 | | | | | | | | | | | | 290 | 0 |
| -09-7 | ۵ ۵ | ى _د | 0 | വ | 1011 | | | | | | | | | | | | 1011 | 0 |
| 7-60- | ٥ | ပ | 4 | 6 | 1204 | | | | | | | | | | | | 1204 | 0 (|
| -60-7 | ۵ | ပ | 9 | 6 | 989 | | | | | | | | | | | | 989 | 0 7 |
| -60- | Z | ပ | 0 | <u>.</u> | 597 | | | | | | | | | | | | 3550 | 200 |
| -09-7 | zz | o c | ο < | - u | 3550 | | | 277 | | | | | | | | | 11059 | 326 |
| 7-09-74 | z | ی ر | 9 | 15.0 | 4984 | 1694 | | | | | | | | | | | 6678 | 14512 |
| 7-00- | c | c | c | | να | | | | | | | | | | | | 84 | 0 |
| 7-60- | ے د | ے د | ۰ د | | 2535 | | | | | | | | | | | | 2535 | 0 |
| 7-60- | ۵ ۵ | ۵ ۵ | 1 4 | | 722 | | | | | | | | | | | | 722 | 0 |
| -09-7 | ۵ | ۵ | ဖ | | 595 | | | | | | | | | | | | 595 | 0 |
| -09-7 | ۵ | a | 80 | | 2685 | | | | | | | | | | | | 2685 | 537 |
| 7-60- | Z: | ٥ | 0 (| | | Ļ | | 107 | | | | | | | | | 3114 | 347 |
| -09-7 | Z 2 | ء د | ~ | | 2949 | 163 | | | | | | | | | | | 4074 | 0 |
| 7-09-74 | zz | ے د | 9 0 | 10.2 | | 1606 | | | | | | | | | | | 1606 | 2000 |
| -08-7 | z | 0 | 8 | | 274 | | | | | | | | | | | | 274 | 0 |
| | | | | | | | | | | | | | | | | | | |

Appendix 7. Continued.

| SM YP TP JD CP BR SS NS FS Misc. Larvae Eggs 105 0 0 105 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | ameters |
|---|--------------|
| 10166 105 105 105 1066 390 1403 3900 1403 3900 152 152 152 152 155 155 1618 1618 1618 | AL SP |
| 10166 330 1430 330 3310 3303 3310 3310 3310 3 | 1 (|
| 10166 330 330 340 340 35030 3610 36213 662 | 105 |
| 10166 390 390 3910 3910 3910 3910 3910 3910 3 | |
| 1403 1403 1403 1503 16213 1632 1633 1703 1704 1804 | 10166 |
| 9330 9310 5336 6213 6213 6213 6214 2752 1103 3072 11103 3072 114 1180 678 678 678 678 70 656 618 618 618 618 618 618 618 61 | 1403 |
| 5310 5310 6213 6213 6213 7103 7103 7103 7103 7103 7103 7104 7104 7104 7108 7108 7108 7108 7108 7108 7108 7108 | 3030 |
| 6213 632 2244 2752 1103 3072 1103 3072 1165 716 678 678 670 656 76 31 1618 1618 163 | 8310 5338 |
| 2244 2752 157 2752 167 284 2752 1618 2753 3072 1163 3072 1163 319 319 319 319 | . e |
| 2244 2752 1575 1677 246 103 3072 1155 1155 1455 1456 168 168 1618 163 | 360 272 |
| 157 246 1103 3072 11155 1155 1155 1155 1155 1155 1140 180 400 400 400 400 400 400 400 400 400 4 | 2244 |
| 246 1103 3072 1155 745 884 678 678 114 114 114 118 770 656 656 656 1618 1618 1618 | 2752 |
| 1103 3072 1155 745 884 678 678 700 598 770 656 656 656 76 76 76 76 76 76 76 76 76 7 | 246 |
| 1155 1155 745 884 678 678 700 900 910 911 911 911 911 912 913 914 916 916 916 916 916 916 916 916 | 1103 |
| 745 884 678 678 114 114 1180 400 598 770 656 656 73 31 1618 1618 163 | 3072 |
| 884 678 678 114 114 116 180 400 598 770 656 656 39 31 1618 168 168 168 | 745 |
| 0 281 114 118 | 884 |
| 281 114 180 400 598 770 656 656 73 0 76 39 31 1618 1618 1618 | 678 |
| 281 114 180 400 598 77 656 656 73 93 31 1618 1618 163 | |
| 180 400 598 770 656 656 33 31 1618 1618 163 | 281 |
| 400 598 770 656 73 0 76 331 168 1618 1618 163 | 180 |
| 770 656 656 73 0 76 331 1618 1618 163 | 400 |
| 73 73 0 76 39 31 168 1618 1618 | 598 770 |
| 73 0 76 39 31 168 1618 1618 | 656 |
| 76 39 31 168 1618 128 0 | 73 |
| 39 31 1618 1618 128 0 | C |
| 31 168 1618 128 0 | 9/ |
| 168 1618 128 0 | |
| 1618 128 0 163 | 168 |
| 128 0 0 163 | 1618 |
| 163 | 128 |
| | 163 |
| | • |

Appendix 7. Continued.

| Sample |) je | Para | arameter | ers | | | | | is | Species/Groups | /Group | ທ | | | | | | |
|--|------|----------|------------|------|--------------------|-----|--|--|----|----------------|--------|----|------|-----|----|-------|-----------------|---------------|
| Date | 10 | Sta | Dpt | Temp | AL | dS. | SM | ΥP | 4 | g _P | CP | BR | \$\$ | N.S | FS | Misc. | Total Larvae | Eggs |
| -06- | 0 | <u> </u> | | 4 | | | | | | | | | | | | | 0 | 0 |
| 8-20-74 | ۵ ۵ | ı w | ο & | 24.0 | | | | | | | | | | | | | 0 | 0 |
| -20-7 | ٥ | ш | 14 | œ | | | | | | | | | | | | | 0 | 0 |
| -20-7 | ۵ | ш | 20 | 8.0 | | | | | | | | | | | | | 0 | 0 |
| - 19-7 | ۵ | g | 0 | 2 | 323 | 46 | | | | | | | | | | | 369 | 0 |
| -19-7 | ٥ | G | 7 | 7 | 28 | | | | | | | | | | | | 58 | 174 |
| 8-19-74 | ۵ | 5 | 4 (| 17.9 | į | | | | | | | | | | | | 0 | 12 |
| - 19-7 | 2 م | . | 6 | N = | 107 | | | | | | | | | | | | 493 | 0 |
| 7-61- | 2 2 | 5 C | 4 | - œ | 220 | | | | | | | | | | | | 220 | 0 |
| -19-7 | z | g | 9 | 00 | 57 | | | | | | | | | | | | 22 | 0 |
| - 19-7 | c | I | c | - | 766 | | | | | | | | | | | | 166 | 0 |
| 8-19-74 | ۵ ۵ | Ξ | 1 4 | 21.4 | 48 | | | | | | | | | | | | 48 | 0 |
| - 19-7 | ۵ | I | 9 | | 52 | | | | | | | | | | | | 52 | 0 |
| - 19-7 | ۵ | I | œ | 4 | 95 | | | | | | | | | | | | 95 | 0 |
| -19-7 | Z: | I | 0 | ć. | 440 | | | | | | | | | | | | 440 | 0 (|
| - 19-7 | z | I | 7 | 5 | 171 | | | | | | | | | | | | 17.1 | 0 0 |
| - 19-7 | z | I | 4 | 6 | ; | | | | | | | | | | | |) (| |
| - 19-7 | z | I | 9 | 2 | 69 | | | | | | | | | | | | n o | > |
| - 10-7 | 0 | ပ | 0 | | 117 | | | | | | | | | | | | 117 | 0 |
| -10-7 | ۵ | ပ | 7 | | | | | | | | | | | | | | 0 | 0 |
| -10-7 | ۵ | ပ | 4 | | | | | | | | | | | | | | 0 (| 0 (|
| -10-7 | ٥ | ပ | 9 | | | | | | | | | | | | | | ٥ ; | > (|
| - 10-7 | Z | ပ | 0 (| | 42 | | | | | | | | | | | | 242 | > C |
| -10 | z | ى ر | N 4 | | 294 | | | | | | | | | | | | 176 | 0 |
| 9-10-74 | zz | ں ر | t (0 | 17.5 | 9E | | | | | | | | | | | | 36 | 0 |
| | | | | | , | | | | | | | | | | | | Ċ | c |
| -10 | ۵ | ۵ | 0 | | 89 | | | | | | | | | | | | 0 0 | |
| -10- | ۵ | ۵ | 7 | თ | | | | | | | | | | | | | > 0 | |
| -10 | ٥ | ٥ | 4 | თ | | | | | | | | | | | | | o c | |
| <u>-</u> 10 | ١ | ا ۵ | 9 | 6 | , | | | | | | | | | | | | , , | · • |
| 9-10-74 | ۵ ۽ | ء د | x (| 0.6 | 35 | | | | | | | | | | | | 72 | 0 |
| 80- | z : | ، د | ۰ د | n (| 7 0 | | | | | | | | | | | | 19.7 | · C |
| န်ဂို | z | ، د | | | 192 | | | | | | | | | | | | 2.2 | C |
| 60- | z: | ، د | 4 (| • | 2 . 20 (| | | | | | | | | | | | 2 4 | 0 |
| -60- | z: | ، د | ه و | ٠ | 4 i | | | | | | | | | | | | 7.0 | 0 0 |
| -60 | z | ۵ | œ | ٠ | 156 | | | | | | | | | | | | - | > |
| | | | | | | | | | | | | | | | | | | |
| The second secon | 1 | | | - | | - | The same of the sa | The state of the last of the l | - | | | | | | | | | |

Appendix 7. Continued.

| SM YP TP UD CP BR SS NS FS MISC. Larvae Eggs C C C C C C C C C C C C C C C C C C | Parameters | | | | | | | is | Species/Groups | /Group | S | | | | | | |
|--|------------|------------|--------------|-----|----|-----|----|----|----------------|--------|----|-----|----|----|-------|-----------------|------|
| | Sta [| Opt | Temp | AL | SP | NS. | ΥР | TP | ۵۲ | CP | BR | \$5 | NS | FS | Misc. | Total Larvae | Eggs |
| 100 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | ши | 0 | თ 0 | | | | | | | | | | | | | 35 | 0 |
| 10.00 19.22 42 19.23 17 10.04 10.05 17 | | ۵ 4 | 90 | | | | | | | | | | | | | o c | 00 |
| 42 42 42 42 42 42 42 42 42 42 42 42 42 4 | | 20 | 10.0 | | | | | | | | | | | | | 0 | 0 |
| 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | | 0 | 6 | | | | | | | | | | | | | 42 | 0 |
| 17.5 | | C 4 | თ თ | | | | | | | | | | | | | 00 | 00 |
| 110 110 111 111 111 111 111 111 | | 9 | 7 | | | | | | | | | | | | | 0 | 0 |
| 19:5 506 17:5 77 19:5 77 19:5 77 19:5 77 19:5 80 19:0 80 19:0 80 19:0 80 19:0 90 19:0 | 9 | 0 | 6 | 170 | | | | | | | | | | | | 170 | 0 |
| 17.5 17.7 17.5 19.5 17.7 17.5 19.5 19.5 19.5 19.5 19.5 19.5 19.5 19 | .n . | 0 1 | o 0 | 206 | | | | | | | | | | | | 506 | 0 |
| 19.5 | | 4 0 | 7 | | | | | | | | | | | | | 00 | 00 |
| 6. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. | | 0 | 19.5 | 7.7 | | | | | | | | | | | | 7.7 | |
| 19.5 36 19.5 36 19.5 39 19.5 3 | | 0 | 6 | • | | | | | | | | | | | | <u>.</u> 0 | 0 |
| 19.56 19.00 19 | _ | 4 | 6 | | | | | | | | | | | | | 36 | 0 |
| 17.5 19.0 19.0 19.0 19.0 19.0 19.5 | _ | 9 | 0 | | | | | | | | | | | | | 0 | 0 |
| 19.00 19 | | ∞ (| ~ 0 | C | | | | | | | | | | | | 0 (| 0 |
| 19.0 19.0 19.0 19.5 19.5 19.5 19.0 | | o 0 | ກດ | 2 | | | | | | | | | | | | တ္ဆ င | 0 0 |
| 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0 | _ | 4 | 0.61 | 39 | | | | | | | | | | | | 39 | 0 |
| 8. 8. 8. 8. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. 9. | II | ဖ ထ | 19.0 16.8 | | | | | | | | | | | | | 00 | 00 |
| 0.000000000000000000000000000000000000 | , | (| i C | | | | | | | | | | | | | , | • |
| 0.000000000000000000000000000000000000 | ى ر | ى د | ກຕ | | | | | | | | | | | | | 0 0 | 0 0 |
| 13.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0 | | 1 4 | (n | | | | | | | | | | | | | o c | o c |
| 14.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0 | | 9 | က | | | | | | | | | | | | | 0 | 0 |
| 14.0 14.0 14.0 14.0 14.0 14.0 14.0 14.0 | | 0 | 4 | | | | | | | | | | | | • | 0 | 0 |
| 13.5 14.0 14.0 14.0 14.0 14.0 14.0 | | 8 | 0 7 | | | | | | | | | | | | | 0 | 0 |
| 14.0 14.0 14.0 14.0 14.0 14.0 | | 4 0 | 13.5 0.5 | | | | | | | | | | | | | 00 | o c |
| 14.0 14.0 13.5 14.0 14.0 14.0 15.0 16.0 17.0 19.5 19.0 19.0 19.0 19.0 19.0 19.0 19.0 19.0 | | (| • | | | | | | | | | | | | | , | , |
| 14.0 14.0 14.0 14.0 14.0 | | ى د | | | | | | | | | | | | | | 0 0 | 0 0 |
| 14.0 14.0 14.0 14.0 | ے د | 1 4 | | | | | | | | | | | | | | > C | 0 0 |
| 13.5 14.0 14.0 13.5 | _ | 9 | | | | | | | | | | | | | | o c | 0 0 |
| 14.0 14.0 14.0 13.5 | _ | œ | က | | | | | | | | | | | | | 0 | 0 |
| 14.0 14.0 13.5 | _ | 0 | | | | | | | | | | | | | | 0 | 0 |
| 14.0 13.5 | | 7 | | | | | | | | | | | | | | 0 | 0 |
| 14.0 13.5 | | 4 | | | | | | | | | | | | | | 0 | 0 |
| 13.5 | | ဖ | | | | | | | | | | | | | | 0 | 0 |
| | | œ | | | | | | | | | | | | | | 0 | 0 |

Appendix 7. Continued.

| Total To | TP JD CP BR SS NS FS Misc. Larvae Egg 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | arameters |
|--|---|------------------------|
| . 4 | . 4 | Temp Dpt C AL SP SM |
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| . 4 | . 4 | |
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| . 4 | | 13.0 13.0 |
| 4 | 4 | |
| 4 | 4 | |
| 4 | 4 | • |
| 4 | 4 | |
| 4 | 4 | • |
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| | | 6.6 |
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Appendix 7. Continued.

| | Eggs | 00000 |
|-------------------|---|--|
| | Total Larvae | 00000 |
| | Total TP JD CP BR SS NS FS Misc. Larvae | |
| | FS | |
| | S Z | • |
| | SS | |
| S | BR | |
| /Group | GP CP | |
| Species/Groups | 9 | |
| Sp | 1.0 | |
| | γP | |
| | SM | |
| | SP | |
| | AL | |
| φ | emp C | 10.5 10.5 10.5 10.5 |
| Sample Parameters | Temp Di Sta Dpt C | 04408 |
| Para | Sta | IIIII |
| 31e | 10 | zzzzz |
| Sam | Date | 11-10-74 11-10-74 11-10-74 11-10-74 11-10-74 |

Appendix 8. Densities (no./1,000 m³) for fish eggs and larvae collected at beach (A, B, F) and open water (C, D, G, H, E, W, R) stations in Cook Plant study areas, southeastern Lake Michigan, 1975.

| Sample | e Par | arameter | ers | | | | | S | Species/Groups | /Group | SC | | | | 4 | | |
|--|--------------------|----------|---|-------------------------------------|------|-----------------------------|-----|------------|----------------|--------|----|----|-----|----|-------|-------------------------------------|--------------------------------|
| Date D) | l Sta | Dpt | Temp | AL | SP | S | d > | d L | 9 | СР | BR | SS | s z | FS | Misc. | Total Larvae | Eggs |
| 4-15-75 [4-15-75 [4-15-75 A | 00ZZ | 0000 | 88 88 6 6 6 6 6 6 7 6 7 6 7 6 7 6 7 6 7 6 7 6 | | | | | | | | | | | | | 0000 | 0000 |
| 4-15-75 [4-15-75 [4-15-75] 4-15-75 | 8 8 8 8 0 0 Z Z | 0000 | 7.5 7.5 5.7 5.7 | | | | | | | | | | | | | 0000 | 0000 |
| 4-15-75 [4-15-75 [4-15-75 4-15-75 | | 0000 | 8 8 9 . 6 6 5 . 7 . 5 . | | | | | | | | | | | | | 0000 | 0000 |
| 5-13-75 [5-13-75 [5-14-75 N | 4 4 4 4 0 0 2 2 | 0000 | 12.9 10.0 10.0 | | | 1790 2890 652 1306 | | | | | | | | | | 1790 2890 652 1306 | 0000 |
| 5-13-75 [5-13-75 [5-14-75] | 8888 | 0000 | 12.0 9.5 9.5 | | | 460 345 208 417 | | | | | | | | | | 460 345 208 417 | 940 |
| 5-13-75 [5-14-75 [5-14-75] | | 0000 | 11.8 10.1 10.1 | | | 560 1569 117 1170 | | | | | | | | | | 560 1569 117 | 0 1234 0 0 |
| 6-10-75 6-24-75 6-10-75 6-24-75 6-23-75 6-23-75 | 44444 44444 | 000000 | 16.0 24.0 16.0 24.0 22.5 | 1666 138 1004 4998 4443 | 1776 | | | | | | | | | | | 1666 138 1004 6774 5664 | 128 0 0 4222 46666 |
| | | | | | | | | | | | | | | | | | |

Appendix 8. Continued.

| C4-175 D B C 24.0 AL SP NP TP UD CP BR SS NS FS Misc. Larvage E098 6-24-75 D B 0 24.0 969 442 450 470 <td< th=""><th>Sample</th><th></th><th>Parameter</th><th>ters</th><th></th><th></th><th></th><th></th><th></th><th>Spi</th><th>Species/Groups</th><th>Groups</th><th>,,</th><th></th><th></th><th></th><th></th><th></th><th></th></td<> | Sample | | Parameter | ters | | | | | | Spi | Species/Groups | Groups | ,, | | | | | | |
|---|---------|---|-----------|----------------|--------------|--------------|------|-----|----|-----|----------------|--------|----|----|----|----|-------|-----------------|-------|
| 24.75 D 8 969 | le e | _ | a O | + + | d d | AL | SP | SM | γb | 41 | 9 | CP | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| 72.4 7.5 D 8 0 16.5 0.24.0 86.9 17.2 0.24.0 86.9 17.2 0.24.0 86.9 17.2 0.24.0 86.0 17.2 0.24.0 86.0 17.2 0.22.0 460.0 | | | | ' | 1 | 000 | | | | | | | | | | | | 090 | |
| 470 470 10-75 B 0 14.0 872 450 | -24-7 | | | | | 969 | | | | | | | | | | | | 142 | o c |
| 47.75 N B 6.4.7 6.4.7 6.4.7 7.7 7.7 8 6.4.7 7.7 7.7 8 6.4.7 7.7 8 6.4.7 7.7 9.7 7.7 9.7 7.7 9.7 7.7 9.7 | 7-01- | | | - (| • | 1 1 2 | | | | | | | | | | | | 870 | 124 |
| 23-75 N B 0 22.6 4311 1336 6164 1 23-75 N B 0 22.6 5867 297 24-75 D F 0 23.3 1395 155 24-75 D F 0 23.3 1395 155 24-75 D F 0 23.3 1395 155 24-75 D F 0 23.3 1395 155 23-75 N F 0 22.9 1715 2975 23-75 N F 0 22.9 1715 2975 23-75 N A 0 26.4 870 1361 23-75 N A 0 26.4 870 1361 23-75 N A 0 26.4 870 1369 23-75 N A 0 26.4 870 1369 23-75 N A 0 26.4 870 1369 24-75 D A 0 26.4 870 1369 24-75 D A 0 26.4 870 1369 24-75 D A 0 26.4 870 1369 24-75 D A 0 26.4 870 1369 24-75 D A 0 26.7 1290 24-75 D B 0 24.5 1290 24-75 D A 0 26.7 1290 24-75 D A | -24-1 | | | 7 - | • | 450 | | | | | | | | | | | | 450 | 0 |
| -23 - 75 N B 0 27.6 5867 297 152 -10 - 75 D F 0 13.8 122 155 155 -10 - 75 D F 0 13.8 122 155 156 -10 - 75 D F 0 13.8 122 155 155 -10 - 75 D F 0 23.3 1114 297 1114 4690 -23 - 75 N F 0 22.9 1561 1561 1561 1514 4690 -16 - 75 N A 0 24.6 8708 196 10773 10773 11713 -16 - 75 N A 0 24.5 1490 1768 10773 11713 -16 - 75 N B 0 24.5 1490 1768 1073 11713 -16 - 75 N B 0 24.5 1490 1768 1080 | -23-7 | | | ٠, | . " | 4311 | 1336 | | | | | | | | | | | 5647 | 297 |
| 102 162 104 15 155 155 1550 1550 1550 1550 1550 1550 1550 1550 1550 1550 1551 1550 1551 1550 1551 1551 1551 1551 1551 1551 1551 1551 1551 1551 1551 1551 1551 1551 1551 1551 1551 1551 1551 1552 1551 1551 1551 1552 1551 1552 1551 1552 | -23-7 | | | 10 | . . | 5867 | 297 | | | | | | | | | | | 6164 | 14129 |
| 10-75 D F 0 23.5 136.2 155 155 155 155 155 155 155 155 155 15 | 1 | | | • | c | • | | | | | | | | | | | | 122 | C |
| -14-75 D F 0 13-8 527 1144 1144 1144 1144 1144 1144 1144 11 | - 10- / | | | - c | ָ פ | 1205 | 7,7 | | | | | | | | | | | 1550 | 155 |
| 24-75 D F 0 23.3 1114 1114 -23-75 N F 0 22.9 1715 2975 3511 -23-75 N F 0 22.9 1715 2975 3611 -16-75 N A 0 26.4 92 1960 19773 -16-75 N A 0 24.6 8708 196 10773 -16-75 N A 0 24.5 180 27.7 297 -16-75 N B 0 24.5 1653 2012 10773 -16-75 N B 0 24.5 490 1768 10773 -17-75 N B 0 24.5 490 1768 1038 -17-75 N B 0 24.4 1223 2363 1238 -16-75 N F 0 24.4 1223 2363 24.4 | - 10-7 | | | ٠- | , c c | 527 | 2 | | | | | | | | | | | 527 | 0 |
| -23-75 N F O 22 9 1715 2975 4690 -23-75 N F O 26.4 92 1950 1561 9511 -16-75 D A O 26.4 92 1950 16773 -16-75 N A O 24.6 8708 1956 10773 -16-75 N A O 24.6 8708 1973 11213 -16-75 N B O 24.5 1450 1768 11213 -16-75 N B O 24.5 1490 1768 1966 2454 -17-75 N B O 24.4 1223 2363 1638 -16-75 N F O 24.4 1290 1280 1280 -16-75 N F O 24.4 2580 1995 1696 1280 -11-75 D A <t< td=""><td>-24-7</td><td></td><td></td><td>. 0</td><td>. r.</td><td>1114</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1114</td><td>0</td></t<> | -24-7 | | | . 0 | . r. | 1114 | | | | | | | | | | | | 1114 | 0 |
| -13-75 N F O 22.9 1950 1561 3611 3611 3611 3611 3611 3611 3611 | -23-7 | | | 7 | <u>ھ</u> | 1715 | 2975 | | | | | | | | | | | 4690 | |
| 16-75 D A 0 26.4 92 10073 16-75 N A 0 26.4 92 1196 1307 10773 16-75 N A 0 24.6 8708 11213 11213 16-75 D B 0 27.7 297 297 17-75 N B 0 24.5 1653 2012 265 17-75 N B 0 24.5 1696 1768 1696 16-75 D F 0 26.7 1038 1038 1038 16-75 D F 0 26.7 1290 3665 1290 16-75 D F 0 24.4 1223 2363 1620 4584 16-75 D A 0 22.9 1995 1620 23.3 4584 11-75 D A 0 23.3 4011 4011 | -23-7 | | | 7 | 6. | 1950 | 1561 | | | | | | | | | | | 3511 | 1953 |
| 16-75 N A 26.4 92 10773 16-75 N A 0 24.6 8270 1196 1307 10773 16-75 N A 0 24.6 8708 1196 297 16-75 D B 0 27.7 297 287 17-75 N B 0 24.5 490 1768 1038 16-75 D F 0 26.7 1290 1290 16-75 D F 0 26.7 1290 1290 16-75 D F 0 26.7 1290 1290 16-75 N F 0 26.7 1995 1038 1038 16-75 N F 0 24.4 1223 236.3 1038 1230 16-75 N F 0 24.4 2589 1995 1040 1040 11-75 D | - 46-7 | | | Š | | | | • . | | | | | | | | | | 0 | 0 |
| -16-75 N A 0 24.6 8270 1196 10773 -16-75 N A 0 24.6 8708 1196 2505 11213 -16-75 N B 0 27.7 297 297 -17-75 N B 0 24.5 1653 2012 3665 -17-75 N B 0 24.5 1690 1796 1038 -16-75 N F 0 24.4 1223 2363 1695 -16-75 N F 0 24.4 1223 2363 1995 -16-75 N F 0 24.4 2589 1995 9 -16-75 N F 0 24.4 2589 1995 9 -11-75 N A 0 23.3 348 23.2 202 -11-75 N A 0 23.3 4011 348 <tr< td=""><td>- 46-7</td><td></td><td></td><td>1 0</td><td></td><td>92</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>92</td><td>0</td></tr<> | - 46-7 | | | 1 0 | | 92 | | | | | | | | | | | | 92 | 0 |
| 16-75 N A 0 24.6 8708 11213 16-75 D B 0 27.7 297 297 16-75 D B 0 24.5 1653 2012 3665 17-75 N B 0 24.5 1693 1768 1038 16-75 D F 0 26.7 1230 2363 1959 1290 16-75 D F 0 24.4 1230 2363 1959 1590 16-75 N F 0 24.4 2589 1995 202 202 16-75 N A 0 22.9 202 202 202 11-75 D A 0 22.9 202 202 202 11-75 D B 0 23.3 348 232 202 202 11-75 D B 0 23.5 4011 <t< td=""><td>- 16-7</td><td></td><td></td><td>1 0</td><td>. 9</td><td>\sim</td><td>1196</td><td></td><td></td><td></td><td>-</td><td>307</td><td></td><td></td><td></td><td></td><td></td><td>10773</td><td>0</td></t<> | - 16-7 | | | 1 0 | . 9 | \sim | 1196 | | | | - | 307 | | | | | | 10773 | 0 |
| 16-75 D B 0 27.7 297 -16-75 N B 0 27.7 1653 2012 3665 -17-75 N B 0 24.5 1653 2012 3665 -17-75 N B 0 24.5 1696 1038 -16-75 D F 0 26.7 1290 1290 -16-75 N F 0 24.4 1223 2363 -16-75 N F 0 24.4 12589 1995 1290 -16-75 N F 0 24.4 1223 2363 2363 -16-75 N A 0 22.9 348 23.3 348 23.2 -11-75 D B 0 23.5 4011 4011 -11-75 D B 0 24.0 34 188 24.9 -11-75 N B 0 | -16-7 | | | 7 | 9. | 7 | | | | | 2 | 505 | | | | | | 11213 | 0 |
| -16-75 D B 0 27.7 29.7 -16-75 N B 0 24.5 1653 2012 3665 -17-75 N B 0 24.5 490 1768 1653 2012 -16-75 N B 0 26.7 1290 1230 2456 1290 | 1 | | | • | | | | | | | | | | | | | | 797 | Ö |
| -16-75 D B 0 27.7 196 3665 -17-75 N B 0 24.5 490 1768 1653 -16-75 N B 0 24.5 490 1768 1638 -16-75 D F 0 26.7 1290 1290 -16-75 N F 0 24.4 2589 1995 3586 -16-75 N F 0 24.4 2589 1995 3586 -11-75 N F 0 22.9 22.9 202 -11-75 N A 0 23.3 348 232 580 -12-75 N A 0 23.3 348 232 583 -11-75 D B 0 23.5 4011 4011 -11-75 N B 0 24.0 94 188 218 218 282 -12-75 | -16-7 | | | 7 | | | | | | | | | | | | | | 67 | n C |
| -17-75 N B 0 24.5 490 1768 1038 -16-75 D F 0 26.7 1038 1038 -16-75 D F 0 26.7 1290 3586 -16-75 N F 0 24.4 2589 1995 4584 -16-75 N F 0 24.4 2589 1995 4584 -11-75 D A 0 22.9 202 202 -11-75 D A 0 23.3 348 232 580 -12-75 N A 0 23.5 4011 580 -11-75 D B 0 23.5 5439 583 -11-75 D B 0 23.5 5439 583 -11-75 D B 0 24.0 94 188 -11-75 N B 0 24.0 218 218 | -16-7 | | | .v c | ى - | 1653 | 2012 | | | | | | | | | | | 3665 | 4736 |
| -16-75 D F O 26.7 1038 1038 1290 <td>-11-7</td> <td></td> <td></td> <td>7 (7</td> <td>i rū</td> <td>490</td> <td>1768</td> <td></td> <td></td> <td></td> <td></td> <td>196</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2454</td> <td>0</td> | -11-7 | | | 7 (7 | i rū | 490 | 1768 | | | | | 196 | | | | | | 2454 | 0 |
| -16-75 D F O 26.7 1038 -16-75 D F O 26.7 1038 -16-75 D F O 24.4 1290 -16-75 N F O 24.4 2589 1995 -16-75 N F O 24.4 2589 1995 -11-75 D A O 22.9 -12-75 N A O 23.3 -12-75 N A O 23.5 4011 -11-75 D B O 23.5 5439 -11-75 D B O 24.0 94 188 -12-75 N B O 24.0 94 188 -12-75 N B O 24.0 218 218 | | | | • | 1 | (| | | | | | | | | | | | 1000 | C |
| -16-75 N F O 24.4 1230 2363 3586 8 -16-75 N F O 24.4 1232 2363 3586 8 -16-75 N F O 24.4 1223 2363 4584 4584 -11-75 D A O 22.9 -11-75 D A O 23.3 348 232 202 -12-75 N A O 23.5 4011 -11-75 D B O 23.5 5439 188 -12-75 N B O 24.0 94 188 -12-75 N B O 24.0 218 218 | -16-7 | | | 0 | · . | 1038 | | | | | | | | | | | | 1200 | |
| -16-75 N F O 24.4 2589 1995 -16-75 N F O 24.4 2589 1995 -11-75 D A O 22.9 -12-75 N A O 23.3 348 232 -12-75 N A O 23.5 4011 -11-75 D B O 23.5 5439 -11-75 D B O 24.0 94 188 -12-75 N B O 24.0 218 218 | - 16-7 | | | N C | `. | 1290 | 2262 | | | | | | | | | | | 3586 | 24 |
| -11-75 D A O 22.9 -11-75 D A O 23.3 -12-75 N A O 23.3 -12-75 N A O 23.5 -11-75 D B O 23.5 -11-75 D B O 23.5 -11-75 D B O 23.5 -11-75 D B O 23.5 -11-75 D B O 24.0 | -16-7 | | | 7 (| i 4 | 1223 2589 | 1995 | | | | | | | | | | | 4584 | ; 0 |
| -11-75 D A O 22.9 -11-75 D A O 23.3 -12-75 N A O 23.3 -12-75 N A O 23.5 -11-75 D B O 23.5 -11-75 D B O 23.5 -11-75 D B O 23.5 -11-75 D B O 23.5 -11-75 D B O 24.0 |) | | | 1 | | ! ! | | | | | | | | | | | | | |
| -11-75 D A O 22.9 -12-75 N A O 23.3 -12-75 N A O 23.3 -12-75 N A O 23.5 -11-75 D B O 23.5 -11-75 D B O 23.5 -12-75 N B O 24.0 94 188 -12-75 N B O 24.0 218 218 -12-75 N B O 24.0 | -111-7 | | | 7 | - | | | | | | | | | | | | | 0 | 0 |
| -12-75 N A O 23.3 202 202 -12-75 N A O 23.3 348 232 580 -11-75 D B O 23.5 5439 -11-75 N B O 24.0 94 188 218 218 218 218 | -11-7 | | | ~ | • | | | | | | | | | | | | | 0 | 0 |
| -12-75 N A O 23.3 348 232 580 -11-75 D B O 23.5 5439 -11-75 D B O 24.0 94 188 -12-75 N B O 24.0 218 218 218 | -12-7 | | | 7 | • | | 202 | | | | | | | | | | | 202 | 0 (|
| -11-75 D B 0 23.5 4011 -11-75 D B 0 23.5 5439 -12-75 N B 0 24.0 94 188 -12-75 N B 0 24.0 218 218 | -12-7 | | | 7 | | 348 | 232 | | | | | | | | | | | 086 | > |
| -11-75 D B O 23.5 5439 -12-75 N B O 24.0 94 188 282 -12-75 N B O 24.0 218 218 436 | -11-7 | | | 2 | 5. | 4011 | | | | | | | | | | | | 4011 | 0 |
| -12-75 N B O 24.0 94 188 282 -12-75 N B O 24.0 218 218 436 | -111-7 | | | 7 | r. | 5439 | | | | | | | | | | | | 5439 | 0 |
| -12-75 N B O 24 O 218 218 436 | -12-7 | | | 7 | | 94 | 188 | | | | | | | | | | | 282 | 0 |
| | -12-7 | | | 7 | | 218 | 218 | | | | | | | | | | | 436 | 0 |
| | | | | | | | | | | | | | | | | | | | |

Appendix 8. Continued.

| Sample Pa | Parameter | ters | | | | | is | Species/Groups | /Group | S. | | | | | | |
|--|-----------|--|---------------------|-----|----|----|------------------------------|----------------|--------|----|------|----|----|-------|--|-----------|
| Date D1 St | Sta Dpt | Temp | AL | SP | SM | dλ | 41 | a _D | CP | BR | \$\$ | NS | FS | Misc. | Total Larvae | Eggs |
| 8-11-75 D F 8-11-75 D F 8-13-75 N F | 0000 | 23.5 23.5 23.0 | 6799 2215 628 | 157 | | | | | | | | | | | 6799 2215 785 584 | 0000 |
| -09-75 D -09-75 D -10-75 N | | 20. | 123 | 1 | | | | | | | | | | | 0 0 123 0 | 0000 |
| -09-75 D -09-75 D -10-75 N -10-75 N | | 21. 21. 18. | 460 111 123 | | | | | | | | | | | | 460 111 0 | 0000 |
| 9-09-75 D 9-09-75 N 9-09-75 N 9-09-75 N 10-14-75 D 10-13-75 N 10-1 | 0000 0000 | 19.8 18.9 18.9 17.8 17.8 16.5 | 148 | | | | 1 1 | | | | | | | | 148 0 0 0 0 0 0 116 | 0000 0000 |
| 10-14-75 D E 10-14-75 D E 10-13-75 N E 10-13-75 N E | 0000 | 18.7 18.7 16.3 | 1833 | | | | | | | | | | | | 0 1833 0 | 0000 |
| 10-14-75 D F 10-14-75 D F 10-13-75 N F 10-13 | 0000 | 16.2 16.2 17.5 17.5 | 194 | | | | | | | | | | | | 194 | 0000 |
| | | | | | | | | | | ŕ | | | | | | |

Appendix 8. Continued.

| 101 Sta Dpt C | Total Temp (e DI Sta Dpt C AL) SP SM YP TP UD CP BR SS NS FS MISC. Larvee E99 (e DI Sta Dpt C AL) SP SM YP TP UD CP BR SS NS FS MISC. Larvee E99 (e DI Sta Dpt C AL) SP SM YP TP UD CP BR SS NS FS MISC. Larvee E99 (e DI Sta Dpt C AL) SP SM SM SM SM SM SM SM SM SM SM SM SM SM | Sample Parameters | ers | | | | Ϋ́ | Species/Groups | /Group | S | | | | | | |
|---|--|-------------------|------------|----|----|----|----|----------------|--------|-----|----|----|----|-------|-----------------|---------------|
| 100 100 100 100 100 100 100 100 100 100 | 00000 0000 0000 0000 0000 0000 0000 0000 | e D1 Sta | Temp | SP | SM | γP | 41 | ۵p | СР | BR | SS | SN | FS | Misc. | Total Larvae | Eggs |
| N N N N N N N N N N N N N N N N N N N | N N N N N N N N N N N N N N N N N N N | | | | | | | | | | | | | | c | • |
| N N N N N N N N N N N N N N N N N N N | N A A 0 13.4 N A A 0 13.4 N A A 0 13.4 N B B 0 0 13.9 N B B 0 13.9 N B B 0 13.9 N B B 0 13.9 N C C 2 3.0 N C C 2 2.2 N C C 2 2.2 N C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C A 1.0 N C C C C A 1.0 N C C C C A 1.0 N C C C C A 1.0 N C C C C A 1.0 N C C C C A 1.0 N C C C C A 1.0 N C C C C C C A 1.0 N C C C C C C C C C C C C C C C C C C | A D | 4 | | | | | | | | | | | | 0 0 | 0 |
| 13.4 N A A O 13.4 N A B O 13.4 N A B O 13.4 N A B O 13.9 N A B O 13 | N N N O S S S S S S S S S S S S S S S S | 5 D A | 4 | | | | | | | | | | | | > (| > (|
| 10.00 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 4 Z | က | | | | | | | | | | | | > | Э· |
| 75 D B 0 15.0 775 D B 0 13.9 775 D F 0 13.9 775 D F 0 13.9 775 D C 2 3.0 775 D C 2 2 3.0 775 D C 2 1.0 775 D C 2 1.0 775 D C 2 4.8 775 D D C 4 4.8 775 D D C 4 4.8 775 D D C 4 4.8 775 D D C 4 4.8 775 D D C 4 8 8 775 D D C 4 8 8 775 D D C 4 8 8 775 D D C 4 8 8 775 D D C 4 8 8 775 D D C 4 8 8 775 D D C 4 8 8 775 D D C 4 8 8 775 D D C 4 8 8 775 D D C 4 8 8 775 D D C 4 8 8 775 D D C 4 8 8 775 D D C 4 8 8 775 D D C 4 8 8 775 D D C 6 1.0 775 D D C 775 D D D C 775 D D D C 775 D D D C 775 D D D C 775 D D D C 775 D D D C 775 D D D C 775 D D D C 775 D D D C 775 D D D C 775 D D D C 775 D D D C 775 D D D C 775 D D D C 775 D D D C 775 D D D D C 775 D D D D C 775 D D D D C 775 D D D D D D D D D D D D D D D D D D | 75 D B 0 15.0 77 N B 0 13.9 77 N B 0 13.9 77 N F 0 13.9 77 | A N | 9 | | | | | | | | | | | | 0 | 0 |
| 75 N B 0 13.5 775 N B 0 13.5 775 N B 0 13.5 775 N B 0 13.9 775 N F 0 13.9 775 N F 0 13.9 775 N F 0 13.9 775 N C 0 2 2.0 775 N C 0 2 1.0 775 N C 0 4.8 775 N C 0 4.8 775 N D 0 4.8 775 N D 0 4.8 775 N D 0 4.8 775 N D 0 6 4.7 775 N D 0 7 1.0 775 N D 0 7 1.0 775 N D 0 7 1.0 775 N D 0 7 1.0 775 N D 0 7 1.0 775 N D 0 7 1.0 775 N D 0 8 4.8 775 N D 0 8 4.8 775 N D 0 8 4.8 775 N D 0 8 4.8 775 N D 0 8 4.8 775 N D 0 8 4.8 775 N D 0 8 4.8 775 N D 0 8 4.8 775 N D 0 8 4.8 775 N D 0 8 4.8 775 N D 0 8 4.8 | 75 N B 0 13.5 75 N B 0 13.5 75 N B 0 13.5 75 N F 0 13.9 75 N F 0 13.9 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N C 0 10.0 75 N D 0 4.8 75 N D 0 6 4.7 75 N D 0 6 0.7 75 N D 0 6 0.7 75 N D 0 6 0.7 75 N D 0 6 0.7 75 N D 0 6 0.7 75 N D 0 6 0.7 75 N D 0 6 0.7 75 N D 0 6 0.7 75 N D 0 6 0.7 75 N D 0 6 0.7 75 N D 0 10.0 75 N D 0 6 0.7 75 N D 0 6 0.7 | 0 | | | | | | | | | | | | | 0 | 0 |
| 75 N B 0 13.5 75 N B 0 13.5 75 N B 0 13.5 75 N B 0 13.9 75 N B 0 13.9 75 N F 0 13.9 75 N C 2 3.0 75 N C 2 3.0 75 N C 2 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 75 N D D 2 4.8 75 N D D 2 4.8 75 N D D 4 4.7 75 N D 75 N D 75 N D 8 4.8 75 N D 8 1.0 | 75 N B 0 13.5 75 N B 0 13.5 75 N B 0 13.5 75 N F 0 13.9 75 N F 0 13.9 75 N C 2 3.0 75 N C 2 3.0 75 N C 2 1.0 75 N C 4 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 7 1.0 75 N C 7 1.0 75 N C 7 1.0 75 N C 8 1.0 75 N C 9 1.0 75 N C 9 1.0 75 N C 9 1.0 75 N C 9 1.0 75 N C 9 1.0 75 N C 9 1.0 75 N C 9 1.0 75 N C 9 1.0 75 N C 9 1.0 75 N C 9 1.0 75 N C 9 1.0 75 N D 9 6 4.7 75 N D 9 6 4.7 75 N D 9 6 0.7 75 N D 9 1.0 75 N D 9 1.0 75 N D 9 1.0 | -/- -/- -/ | | | | | | | | | | | | | o C | o C |
| 75 N B 0 13.5 75 N B 0 13.9 775 N F 0 13.9 775 N F 0 13.9 775 N C 2 3.0 775 N C 2 1.0 775 N C 2 1.0 775 N C 4 2.2 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 7 1.0 775 N C 8 1.0 775 N C 9 1.0 775 N C 9 1.0 775 N C 9 1.0 775 N C 1 1.0 775 | 75 N B 0 13.5 75 N B 0 13.5 75 D F 0 13.9 775 D C 0 3.0 775 D C 0 3.0 775 D C 0 2.2 775 D C 6 2.2 775 D C 6 2.2 775 D C 6 2.2 775 D C 6 2.2 775 D C 6 4.2 775 D C 6 4.0 775 D C 6 4.0 775 D D 0 4.8 775 D D 0 4.8 775 D D 0 4.8 775 D D 0 4.8 775 D D 0 6 4.7 775 D D 0 6 6 0.7 | -75 U B | • | | | | | | | | | | | | o c | o c |
| 75 D F 0 13.9 75 N F 0 13.9 75 N F 0 13.9 75 N F 0 13.9 75 N F 0 13.9 75 N C 2 3.0 75 N C 6 2.2 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N C 6 1.0 75 N D 6 4 8 75 N D | 75 N F 0 13.9 75 N F 0 13.9 75 N F 0 13.9 77 N F 0 13.9 77 N F 0 13.9 77 N F 0 13.9 77 N F 0 13.9 77 N C 2 2.2 77 N C 2 1.0 77 N C 4 1.0 77 N C 4 1.0 77 N C 6 1.0 77 N C 6 1.0 77 N C 7 | | | | | | | | | | | | | | o C | o C |
| 75 D F 0 13.9 775 D F 0 13.9 775 D F 0 13.9 775 D C 0 3.0 775 D C 0 3.0 775 D C 0 4 2.2 775 D C 0 4 2.2 775 D C 0 4 2.2 775 D C 0 4 2.2 775 D C 0 4 2.2 775 D C 0 4 2.2 775 D C 0 4 2.2 775 D D 0 4 4 8 775 D D 0 6 4 4 7 775 D D 0 6 4 4 7 775 D D 0 6 4 4 7 775 D D 0 6 4 1.0 775 D D 0 6 4 1.0 775 D D 0 6 1.0 | 75 D F 0 13.9 775 D F 0 13.9 775 D F 0 13.9 775 D C 2 3.0 775 D C 2 3.0 775 D C 4 2.2 775 D C 4 2.2 775 D C 4 2.2 775 D C 4 1.0 775 D C 4 1.0 775 D D 2 4.8 775 D D 2 4.8 775 D D 2 4.8 775 D D 2 4.8 775 D D 2 4.8 775 D D 2 4.8 775 D D 2 4.8 775 D D 2 4.8 775 D D 2 4.8 775 D D 2 4.8 775 D D 6 0 1.0 775 D D 6 0 1.0 775 D D D 775 D D 775 D D 775 D D D 775 D D D 775 D D D 775 D D D 775 D D D 775 D D D 775 D D D D | -75 N B | • | | | | | | | | | | | |) | > |
| 775 N F 0 13.9 775 N F 0 13.9 775 N F 0 13.9 775 N F 0 13.9 775 D C 0 3.0 775 D C 0 4 2.2 775 D C 0 4 2.2 775 N C 2 1.0 775 N C 2 1.0 775 N C 4 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 7 1.0 775 N C 7 1.0 775 N C 7 1.0 775 N C 7 1.0 775 N C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 775 N D C 7 1.0 | 75 D F 0 13.9 775 N F 0 13.9 775 N F 0 13.9 775 D C 2 3.0 775 D C 2 3.0 775 D C 4 2.2 775 N C 2 1.0 775 N C 2 1.0 775 N C 2 1.0 775 N C 4 1.0 775 N C 4 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N D 2 1.0 775 N D 2 1.0 775 N D 2 1.0 775 N D 6 0.7 775 N D 6 0.7 775 N D | -75 D F | | | | | | | | | | | | | 0 | 0 |
| 75 N F O 13.9 75 N F O 13.9 75 N F O 13.9 775 N C O 3.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 | 75 N F 0 13.9 75 N F 0 13.9 75 N F 0 13.9 775 D C 2 3.0 775 D C 2 2 3.0 775 D C 4 2.2 775 N C 0 1.0 775 N C 4 1.0 775 N C 4 1.0 775 N C 4 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N C 6 1.0 775 N D C 775 N D | .75 D F | • | | | | | | | | | | | | 0 | 0 |
| 75 N F O 13.9 75 D C O 3.0 775 D C O 3.0 775 D C O 4 2.2 775 D C O 4 2.2 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N C O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 775 N D O 1.0 | 75 N F O 13.9 75 D C O 3.0 775 D C O 3.0 775 D C O 4 2.2 775 D C O 4 2.2 775 N C 2 1.0 775 N C 2 1.0 775 N C 4 1.0 775 N C 4 1.0 775 N C 4 1.0 775 N C 6 1.0 775 N C 7 1.0 775 N C 7 1.0 775 N C 7 1.0 775 N C 1 1.0 775 N C 1 1.0 775 N C 1 1.0 775 N C 1 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 775 N D C 0 1.0 | -75 N F | ෆ | | | | | | | | | | | | 0 | 0 |
| 44-75 D C O 3.0 44-75 D C 2 3.0 44-75 D C 4 2.2 44-75 D C 6 2.2 44-75 N C O 1.0 44-75 N C O 1.0 44-75 N C 0 1.0 44-75 N C 0 1.0 44-75 N C 0 1.0 44-75 D D 0 4.8 44-75 D D 0 4.8 44-75 D D 0 4.8 44-75 D D 0 1.0 44-75 D D 0 1.0 44-75 D D 0 1.0 44-75 N D 0 1.0 44-75 N D 0 1.0 44-75 N D 0 1.0 44-75 N D 0 1.0 44-75 N D 0 1.0 44-75 N D 0 1.0 44-75 N D 0 1.0 44-75 N D 0 1.0 44-75 N D 0 1.0 44-75 N D 0 1.0 44-75 N D 0 1.0 | 14-75 D C 2 3.0 105 105 105 105 105 105 105 105 105 10 | -75 N F | ю | | | | | | | | | | | | 0 | 0 |
| 44-75 D C 0 3.0 44-75 D C 4 2.2 44-75 D C 6 2.2 44-75 N C 0 1.0 44-75 N C 2 1.0 44-75 N C 4 1.0 44-75 N C 6 1.0 44-75 D D 0 4.8 44-75 D D 0 4.8 44-75 D D 6 4.7 44-75 D D 6 4.7 44-75 D D 6 4.7 44-75 N D 0 1.0 44-75 N D 0 1.0 44-75 N D 8 1.0 | 44-75 D C C 2 3.0 44-75 D C C 2 2.2 44-75 D C C 2 2.2 44-75 N C O 1.0 44-75 N C O 1.0 44-75 N C O 1.0 44-75 D D O 4.8 44-75 D D 0 4.8 44-75 D D 6 4.7 44-75 D D 6 4.7 44-75 D D 6 4.7 44-75 D D 6 4.7 44-75 N D 0 1.0 44-75 N D 0 1.0 44-75 N D 6 6 4.7 44-75 N D 6 4.7 44-75 N D 6 4.7 44-75 N D 6 6 4.7 44-75 N D 6 0 1.0 44-75 N D 6 0 1.0 44-75 N D 8 1.0 | | | | | | | | | | | | | | c | c |
| 44-75 D C 2 3.0 44-75 D C 4 2.2 44-75 N C 0 1.0 44-75 N C 2 1.0 44-75 N C 2 1.0 44-75 N C 4 1.0 44-75 N C 4 1.0 44-75 D D 0 4.8 44-75 D D 0 4.8 44-75 D D 0 4.8 44-75 D D 0 1.0 44-75 N D 0 1.0 44-75 N D 0 1.0 44-75 N D 0 1.0 44-75 N D 0 1.0 | 105 105 105 105 105 105 105 105 105 105 | 4-75 D C | | | | | | | | | | | | | | |
| 4-75 D C 4 2.2 4-75 N C 6 2.2 4-75 N C 9 1.0 6 2.2 4-75 N C 4 1.0 7-75 N C 4 1.0 7-75 N C 6 1.0 7-75 N C 6 1.0 7-75 D D 0 4.8 7-75 D D 0 4.8 7-75 D D 6 4.7 7-75 D D 6 4.7 7-75 D D 6 4.7 7-75 D D 6 4.7 7-75 D D 6 7.0 7-75 D D 6 7.0 7-75 D D 6 7.0 7-75 D D 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 4-75 D C 4 2.2 4-75 N C 5 2.2 4-75 N C 2 1.0 4-75 N C 2 1.0 4-75 N C 4 1.0 4-75 N C 4 1.0 4-75 D D 0 4.8 4-75 D D 0 4.8 4-75 D D 6 4.7 4-75 N D 6 1.0 4-75 N D 6 1.0 4-75 N D 6 1.0 4-75 N D 6 0.7 | 4-75 D C | | | | | | | | L | | | | | О Щ С | 0 |
| 4-75 D C 6 2.2 4-75 N C 0 1.0 4-75 N C 2 1.0 4-75 N C 4 1.0 4-75 N C 6 1.0 4-75 D D 0 4.8 4-75 D D 0 4.8 4-75 D D 6 4.7 4-75 D D 8 4.8 4-75 N D 0 1.0 4-75 N D 0 1.0 | 4-75 D C 6 2.2 4-75 N C 2 1.0 4-75 N C 4 1.0 4-75 N C 6 1.0 4-75 D D 0 4.8 4-75 D D 0 4.8 4-75 D D 0 4 8 4-75 D D 6 4.7 4-75 D D 8 4.7 4-75 D D 6 4.7 4-75 N D 0 1.0 4-75 N D 0 1.0 4-75 N D 0 8 0.0 4-75 N D 0 8 0.0 4-75 N D 0 8 0.0 4-75 N D 0 8 0 0.0 4-75 N D 0 8 0 0.0 4-75 N D 0 8 0 0.0 4-75 N D 0 8 0 0.0 | 4-75 D C | | | | | | | | 202 | | | | | 2 | 0 |
| 4-75 N C 0 1.0 4-75 N C 2 1.0 4-75 N C 2 1.0 4-75 N C 4 1.0 4-75 N C 4 1.0 6 1.0 7-75 D D 0 4.8 7-75 D D 2 4.8 7-75 D D 4 4.8 7-75 D D 6 4.7 7-75 D D 6 4.7 7-75 D D 6 4.7 7-75 D D 6 1.0 7-75 D D 6 0 1.0 7-75 D D 6 0 1.0 7-75 D D 6 0 1.0 7-75 D D 6 0 1.0 7-75 D D 6 0 1.0 7-75 D D 6 0 1.0 7-75 D D 6 0 1.0 7-75 D D 7 1.0 7-75 D 7 | 4-75 N C 0 1.0 4-75 N C 2 1.0 4-75 N C 2 1.0 4-75 N C 6 1.0 4-75 N C 6 1.0 6-75 N C 6 1.0 6-75 N C 6 1.0 7-75 N D 0 4.8 7-75 N D 0 4.8 7-75 N D 0 1.0 7-75 N D 0 1.0 7-75 N D 0 1.0 7-75 N D 0 1.0 7-75 N D 0 1.0 7-75 N D 0 1.0 7-75 N D 0 1.0 7-75 N D 0 1.0 7-75 N D 0 1.0 7-75 N D 0 1.0 7-75 N D 0 1.0 7-75 N D 0 1.0 7-75 N D 0 1.0 | 4-75 D C | | | | | | | | | | | | | . | |
| 4-75 N C 2 1.0 4-75 N C 2 1.0 4-75 N C 4 1.0 4-75 N C 4 1.0 6 1.0 4-75 D D 0 4.8 4-75 D D 2 4.8 4-75 D D 6 4.7 4-75 D D 8 4.8 4-75 N D 0 1.0 4-75 N D 0 1.0 4-75 N D 6 0.7 4-75 N D 6 0.7 | 4-75 N C 2 1.0 4-75 N C 4 1.0 4-75 N C 4 1.0 4-75 N C 4 1.0 4-75 D D 0 4.8 4-75 D D 2 4.8 4-75 D D 4 4.8 4-75 D D 6 4.7 4-75 D D 8 4.8 4-75 N D 6 1.0 4-75 N D 0 1.0 4-75 N D 6 0.7 4-75 N D 8 1.0 | 4-75 N C | | | | | | | | | | | | | 0 | 0 |
| 4-75 N C 4 1.0 4-75 N C 6 1.0 4-75 D D 0 4.8 4-75 D D 2 4.8 4-75 D D 2 4.8 4-75 D D 4 4.8 4-75 D D 6 4.7 4-75 D D 6 4.7 4-75 D D 6 1.0 4-75 N D 6 0.7 4-75 N D 6 0.7 | 4-75 N C 4 1.0 4-75 N C 6 1.0 4-75 N C 6 1.0 0 4-75 D D 0 4.8 4-75 D D 2 4.8 4-75 D D 4 4.8 4-75 D D 6 4.7 4-75 D D 8 4.8 4-75 N D 0 1.0 4-75 N D 0 1.0 4-75 N D 0 1.0 4-75 N D 0 1.0 4-75 N D 0 1.0 4-75 N D 0 1.0 4-75 N D 0 1.0 4-75 N D 0 1.0 4-75 N D 0 1.0 | 4-75 N C | | | | | | | | | | | | | > (| 0 (|
| 4-75 N C 6 1.0 0 4-75 D D 0 4.8 4-75 D D 0 4.8 4-75 D D 0 4.8 6 4.7 4-75 D D 6 4.7 6 4.7 7 D D 6 4.7 7 D D 8 4.8 7-75 N D 0 1.0 7-75 N D 0 1.0 7-75 N D 6 0.7 7-75 N D 6 0.7 7-75 N D 6 0.7 | 4-75 N C 6 1.0 0 4.8 0 0 4.8 0 0 0 4.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 4-75 N C | | | | | | | | | | | | |)) |) |
| 4-75 D D O 4.8 4-75 D D 2 4.8 4-75 D D 2 4.8 4-75 D D 6 4.7 4-75 D D 8 4.8 4-75 D D 8 4.8 4-75 N D O 1.0 4-75 N D 2 1.0 4-75 N D 6 0.7 4-75 N D 6 0.7 | 4-75 D D O 4.8 4-75 D D 2 4.8 4-75 D D 2 4.8 4-75 D D 6 4.7 4-75 D D 8 4.8 4-75 N D O 1.0 4-75 N D 0 1.0 4-75 N D 0 1.0 4-75 N D 2 1.0 4-75 N D 6 0.7 4-75 N D 8 1.0 | 4-75 N C | | | | | | | | | | | | | o | O |
| 4-75 D D 2 4.8 4-75 D D 4 4.8 4-75 D D 6 4.7 4-75 D D 8 4.8 4-75 N D 0 1.0 4-75 N D 2 1.0 4-75 N D 6 0.7 4-75 N D 6 0.7 | 4-75 D D 2 4.8 4-75 D D 4 4.8 4-75 D D 6 4.7 4-75 D D 8 4.8 4-75 N D 0 1.0 4-75 N D 2 1.0 4-75 N D 6 0.7 4-75 N D 6 0.7 | 4-75 D D | 4 . | | | | | | | | | | | | 0 | 0 |
| 4-75 D D 4 4.8 4-75 D D 6 4.7 4-75 D D 8 4.8 4-75 N D 0 1.0 4-75 N D 2 1.0 4-75 N D 6 0.7 4-75 N D 6 0.7 | 4-75 D D 4 4.8 4-75 D D 6 4.7 4-75 D D 8 4.8 4-75 N D 0 1.0 4-75 N D 2 1.0 4-75 N D 6 0.7 4-75 N D 8 1.0 | 4-75 D D | 8. | | | | | | | | | | | | 0 | 0 |
| 4-75 D D 6 4.7 4-75 D D 8 4.8 4-75 N D 0 1.0 4-75 N D 2 1.0 4-75 N D 2 1.0 4-75 N D 6 0.7 4-75 N D 6 0.7 | 4-75 D D 6 4.7 4-75 D D 8 4.8 4-75 N D 0 1.0 4-75 N D 2 1.0 4-75 N D 2 1.0 4-75 N D 6 0.7 4-75 N D 8 1.0 | 4-75 D D | 8.4 | | | | | | | | | | | | 0 | 0 |
| 14-75 D D 8 4.8 14-75 N D 0 1.0 14-75 N D 2 1.0 14-75 N D 4 1.0 14-75 N D 6 0.7 14-75 N D 8 1.0 | 14-75 D D 8 4.8 14-75 N D 0 1.0 14-75 N D 2 1.0 14-75 N D 2 1.0 14-75 N D 4 1.0 14-75 N D 8 1.0 | 14-75 D D | 4.7 | | | | | | | | | | | | 0 | 0 |
| 14-75 N D 0 1.0 14-75 N D 2 1.0 14-75 N D 4 1.0 14-75 N D 6 0.7 14-75 N D 8 1.0 | 14-75 N D 0 1.0 14-75 N D 2 1.0 14-75 N D 4 1.0 14-75 N D 6 0.7 14-75 N D 8 1.0 | 14-75 D D | 4.8 | | | | | | | | | | | | 0 | 0 |
| 14-75 N D 2 1.0 14-75 N D 4 1.0 14-75 N D 6 0.7 14-75 N D 8 1.0 | 14-75 N D 2 1.0 14-75 N D 4 1.0 14-75 N D 6 0.7 14-75 N D 8 1.0 | 14-75 N D | 0.1 | | | | | | | | | | | | 0 | 0 |
| 4-75 N D 4 1.0 0 4-75 N D 6 0.7 0 4-75 N D 8 1.0 0 | 4-75 N D 4 1.0 0 4-75 N D 6 0.7 0 4-75 N D 8 1.0 0 | 4-75 N D | 0.4 | | | | | | | | | | | | 0 | 0 |
| 4-75 N D 6 0.7 0 0 4-75 N D 8 1.0 0 | 4-75 N D 6 0.7 4-75 N D 8 1.0 | 4-75 N D | 0.4 | | | | | | | | | | | | 0 | 0 |
| 4-75 N D 8 1.0 | 4-75 N D 8 1.0 | 4-75 N D | 0.7 | | | | | | | | | | | | 0 | 0 |
| | | 4-75 N D | 0.1 | | | | | | | | | | | | 0 | 0 |

Appendix 8. Continued.

| Sample Para | Parameter | in s | | | | | λS | Species/Groups | 'Group | w | | | | | | |
|----------------------------|------------|-----------------|----|----|----|----|-----|----------------|--------|-----|----|----|----|-------|-----------------|---------------|
| Date D1 Sta | Dpt | Temp C | AL | SP | SM | γP | 1.0 | aک | СР | BR | 88 | NS | FS | Misc. | Total Larvae | Eggs |
| -16-75 D | 0 | | | | | | | | | | | | | | c | |
| -16-75 D | · & | | | | | | | | | | | | | | 0 | 0 |
| -16-75 D | 4 | | | | | | | | | 135 | | | | | 135 | 0 |
| -16-75 D | 20 | | | | , | | | | | | | | | | 0 | 0 |
| -16-75 N | 0 | | | | | | | | | | | | | | 0 | 0 |
| -16-75 N | œ : | • | | | | | | | | | | | | | 0 | 0 |
| 4-16-75 N E 4-16-75 N E | 20 20 | 3.5 .5 | | | | | | | | | | | | | 00 | 00 |
| | | | | | | | | | | | | | | | | |
| 4-14-75 D G | 0 | 1.9 | | | | | | | | | | | | | 0 | 0 |
| -14-75 D | Ŋ | 1 .9 | | | | | | | | | | | | | 0 | 0 |
| -14-75 D | 4 | 1.7 | | | | | | | | | | | | | 0 | 0 |
| -14-75 D | 9 | 1.7 | | | | | | | | | | | | | 0 | 0 |
| -14-75 N | 0 | - . | | | | | | | | | | | | | 0 | 0 |
| -14-75 N | 7 | - . | | | | | | | | | | | | | 0 | 0 |
| -14-75 N | 4 | | | | | | | | | | | | | | 0 | 0 |
| -14-75 N | 9 | - - | | | | | | | | | | | | | 0 | 0 |
| -44-75 D | c | • | | | | | | | | | | | | | C | (|
| -14-75 | , | - - | | | | | | | | | | | | | > 0 | 0 |
| -14-75 D | 4 4 | | | | | | | | | | | | | | 0 | 0 0 |
| -14-75 D | 9 | 0 | | | | | | | | | | | | | o c | c |
| -14-75 D | 80 | 0. | | | | | | | | | | | | | 0 | 0 |
| -14-75 N | 0 | 0.5 | | | | | | | | | | | | | 0 | 0 |
| -14-75 N | 7 | 0.5 | | | | | | | | | | | | | 0 | 0 |
| -14-75 N | 4 | 0.5 | | | | | | | | | | | | | 0 | 0 |
| 4-14-75 N H 4-14-75 N H | ဖေထ | | | | | | | | | | | | | | 00 | 00 |
| L | (| | | | | | | | | | | | | | | |
| -14-/5 U | ٥ (| | | | | | | | | | | | | | 0 (| 0 (|
| - 14-75 D | ٧ < | | | | | | | | | | | | | | 0 (| > 0 |
| -14-75 D | 7 U | | | | | | | | | | | | | | > C | > C |
| -14-75 N | o C | | | | | | | | | | | | | | . | > < |
| 4-14-75 N R | 0 | 4 | | | | | | | | | | | | | > c | o c |
| -14-75 N | 4 | | | | | | | | | | | | | - | 0 | 0 |
| -14-75 N | 9 | | | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

Appendix 8. Continued.

| 1 | Di Sta Dpt C AL SP SM VP TP UD CP BR SS NS FS Misc. Larvae Egg Di W 14 3.77 Di W 14 3.77 Di W 14 3.77 Di W 15 3.77 Di W 15 3.77 Di W 16 3.77 Di W 17 3.77 Di W 18 3.77 Di W 18 3.77 Di W 18 3.77 Di W 18 3.77 Di W 18 3.77 Di W 19 4.77 Di W 19 4.77 Di W 19 5.77 Di W 19 5 | | | | | | | | | | | | | | | | |
|--|--|---|----------|----|----|-------|----|-----|----|----|----|----|----|----|-------|-----------------|---------------|
| ### ### ############################## | No. | l Sta Dp | - | AL | SP | SM | γр | 1.0 | OD | СР | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| S S S S S S S S S S S S S S S S S S S | N N N N N N N N N N | 3 | 1 | | | | | | | | | | | | | c | C |
| N N K K L L L L L L L L L L L L L L L L | N N N N N N N N N N | | | | | | | | | | | | | | | 0 | 0 |
| N N N N N N N N N N | N N N N N N N N N N | 2 C | | | | | | | | | | | | | | 0 | 0 |
| N N N N N N N N N N N N N N N N N N N | N W W 0 3.77 N W W 14 2.15 N W W 14 2.15 N W W 14 2.15 N W W 14 2.15 N W W 14 2.15 N W W 14 2.15 N W W 15 2.15 N C 0 4 9.0 N C 0 8 2.2 N C 0 10.0 N C 0 | × 0 0 | | | | | | | | | | | | | | 0 | 0 |
| N N K K B 3.7 N N K K B 3.7 N N K K B 3.7 N N N K K B 3.7 N N N N N N N N N N N N N N N N N N N | N N N K 8 3 3 7 8 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 | 3 2 | | | | | | | | | | | | | | 0 | 0 |
| N W 14 14 3.5 N W 14 14 14 15 15 N W 14 14 14 15 N W 14 14 14 15 N W 14 14 14 15 N W 14 14 14 15 N W 14 14 15 N W | N W 20 3.5 | × × | | | | | | | | | | | | | | 0 | 0 |
| S N W ≥ 0 3.5 N W ≥ 0 3.5 S D C 0 10.0 S D C 2 10.0 S D C 2 2.0 S D C 3.5 S D C 4 2.0 S D D 5 2 10.0 S D D 6 8 8.5 S D D 6 8 8.5 S D D 6 8 8.5 S D D 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | S N W 20 3.5 N W 20 3.5 N W 20 3.5 S D C 0 10.0 S D C 2 10.0 S D C 2 2 19.0 S D C 2 2 19.0 S D C 2 2 19.0 S D C 2 3 10.0 S D C 3 2 19.0 S D C 4 3.0 S D C 5 3.0 S D C 6 8.0 S D C 7 10.0 | N N | | | | | | | | | | | | | | 0 | 0 |
| N | 8 D C 0 10.0 8 D C 2 19.0 8 D C 2 2 19.0 8 D C 2 2 19.0 8 D C 2 8.2 8 N C 2 8.2 8 N C 2 8.2 8 N C 2 8.2 8 N C 2 8.2 8 N C 2 8.2 8 N C 2 8.3 8 N C 2 8.3 8 N C 2 8.3 8 N C 2 8.3 8 N C 2 8.3 8 N C 3 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | 3 Z | | | | | | | | | | | | | | 0 | 0 |
| 5 D C C C C C C C C C C C C C C C C C C | S D C C C C C C C C C C C C C C C C C C | ر د | | | | | | | | | | | | | | c | C |
| 219 219 219 219 219 219 219 219 219 219 | 219 219 219 219 219 219 219 219 219 219 | ט נ מ | | | | | | | | | | | | | | o c | o c |
| 573 573 573 573 573 573 573 573 | 8 1 1 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 | ر د د | <u> </u> | | | 219 | | | | | | | | | | 219 |) C |
| 55 N C C 2 8.2 56 N C C 2 8.2 57 N C C 2 8.2 58 N C C 4 8.2 59 N D D C 10.0 50 D D A 10.0 50 D D A 10.0 50 D D A 10.0 51 D D B 8.5 52 N D D B 8.5 53 N D D B 8.5 54 N D D B 9.9 55 N D D B 9.9 56 N D D A 10.0 57 N D C B 9.9 58 N D C B 9.9 59 N D C B 9.9 50 N D C B 9.9 50 N D C B 9.9 50 N D C B 9.9 51 N D C B 9.9 52 N D C B 9.9 53 N D C B 9.9 54 N D C B 9.9 55 N D C B 9.9 56 N D C B 9.9 57 N D C B 9.9 58 N D C B 9.9 59 N D C B 9.9 50 N D C B 9.9 5 | 8 N N C C S 8 2 S S S S S S S S S S S S S S S S S | ر د د د د | | | | 573 | | | | | | | | | | 573 | o c |
| 5 N C 2 8 8.2 5 N C 4 8 8.2 5 N C 4 8 8.2 5 N C 6 8 9.2 5 N C 6 8 9.2 5 N C 6 8 9.2 5 N C 6 8 9.3 5 N C 7 9 8.2 5 N C 8 9.9 5 N D 0 8 9.9 5 N D 0 8 9.9 5 N D 0 8 9.9 5 N D 0 8 9.9 5 N D 0 8 9.9 5 N D 0 8 9.9 5 N D 0 8 9.9 5 N D 0 8 9.9 5 N D 0 8 9.9 5 N D 0 8 9.9 5 N D 0 9 9.9 5 N D 0 0 0.2 5 N | 5 N C 2 8 2 8 2 8 2 8 2 8 2 8 2 8 2 8 2 8 2 | יי פיי | | | | 2 7 2 | | | | | | | | | | 5 | |
| 5 N C 2 2 8.2 5 N C 6 8.2 5 N C 6 8.2 5 N C 6 8.2 5 D D 0 0 10.0 6 D D 2 10.0 6 D D 4 10.0 6 D D 8 8.5 7 N D 0 9.9 | 5 N C 4 8 2 2 6 8 2 2 8 2 2 8 2 2 8 2 2 8 2 2 8 2 2 9 2 2 9 2 9 | ာ (z : | | | | | | | | | | | | | | | |
| 55 N C 4 8.2 55 N C 6 8.2 56 N C 6 8.2 57 N C 6 8.2 58 N C 6 8.2 59 D D 0 10.0 69 B 2 69 D B 8 8.5 69 D B 6 8.5 69 D B 70 C C C C C C C C C C C C C C C C C C | 55 N C 5 4 8.2 55 N C 6 8.2 56 N C 6 8.2 57 N C 6 8.2 58 N D D 0 10.0 58 D D 0 10.0 58 D D 0 2 10.0 58 N D 0 8 8.5 58 N D 0 8 9.9 58 N D 0 8 9.9 58 N D 0 8 9.9 59 N D 0 10.2 50 N D 10.2 50 N D 10.2 50 N D 10.2 50 N D 10.2 50 N D 10.1 50 N D 10.1 50 N D 10.1 | ນ : ຂ : | | | | | | | | | | | | | | > (| > (|
| 5 N C 6 8.2 5 O D 0 10.0 5 D D 0 10.0 5 D D 0 2 10.0 6 D D 8 8.5 5 D D 8 8.5 5 N D 0 8 8.5 5 N D 0 9.9 6 N D 0 9.9 7 N D 0 9.9 | 5 N C 6 8.2 5 D D 0 10.0 5 D D 2 10.0 5 D D 4 10.0 6 D D 8 8.5 6 D D 8 8.5 7 N D 2 9.9 7 N D 2 9.9 7 N D 6 9.9 7 N D 6 9.9 7 N D 7 9.9 7 N D 8 9.9 7 N | ပ Z | | | | | | | | | | | | | | 0 (| 0 |
| 5 D D 0 10.0 5 D D 2 10.0 5 D D 8 8 8.5 5 D D 8 8 8.5 5 N D 0 9.9 5 N D 2 9.9 5 N D 2 9.9 5 N D 4 9.9 5 N D 6 9.9 5 N D 6 9.9 5 N D 7.0 | 5 D D 0 10.0 5 D D 2 10.0 5 D D 2 10.0 5 D D 4 10.0 5 D D 6 8 8.5 5 D D 8 8.5 5 N D 0 9.9 5 N D 0 9.9 5 N D 6 9.9 5 N D 6 9.9 5 N D 7.0 6 D 0 10.1 6 D 10.1 7 D 10.0 7 D 10.1 7 D 10.0 7 D 10.0 7 D 10.1 7 D 10.0 7 D 10.1 7 D 10.0 7 D 10.1 7 D 10.0 7 D 10.1 7 D 10.0 | N Z | • | | | | | | | | | | | | | 0 | 0 |
| 5 D D 2 10.0 5 D D 6 8 8 5 5 D D 7 10.0 5 D D 6 8 8 5 5 N D 0 2 9 9 5 N D 0 2 9 9 5 N D 6 9 9 5 N D 6 9 9 5 N D 7 10.2 5 D E 14 5.9 5 D E 14 5.9 5 N E 8 10.1 5 N E 14 7.0 5 N E 20 7.0 | 5 D D 2 100.0 5 D D 4 10.0 5 D D 6 8 8.5 5 N D 0 8 9.9 5 N D 0 9.9 5 N D 6 9.9 5 N D 7.0 6 0.0 7 D E 14 7.0 | 0 | | | | | | | | | | | | | | 0 | 0 |
| 5 D D 6 8 8.5 5 D D 6 8 8.5 5 N D 0 9.9 5 N D 0 9.9 5 N D 0 9.9 7 122 7 N D 6 9.9 7 N D 6 9.9 7 N D 7 9.9 7 N D 8 9.9 | 5 D D 4 10.0 5 D D 6 8.5 5 N D 0 9.9 5 N D 0 9.9 5 N D 0 9.9 5 N D 6 9.9 5 N D 6 9.9 5 N D 6 9.9 5 N D 7.0 6 0.1 7 122 7 122 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | , c | | | | | | | | | | | | | | 0 | 0 |
| 5 D D 6 8 8.5 5 N D 0 8 8.5 5 N D 0 9.9 5 N D 2 9.9 5 N D 2 9.9 6 9.9 5 N D 6 9.9 6 9.9 6 9.9 6 9.9 7 D E 0 10.2 7 D E 14 5.9 5 N E 14 7.0 5 N E 14 7.0 | 5 D D 6 8 8.5 5 N D 0 9.9 5 N D 0 9.9 5 N D 0 9.9 5 N D 0 9.9 6 N D 2 9.9 7 N D 6 9.9 7 N D 6 9.9 7 N D 7 O 10.2 7 N D 8 9.9 7 N E 14 5.9 7 N E 14 7.0 7 N E 20 7.0 | , c | | | | | | | | | | | | | | 0 | 0 |
| 5 N D 0 8 8.5 5 N D 0 9.9 5 N D 0 9.9 5 N D 0 9.9 5 N D 0 9.9 6 N D 2 9.9 7 N D 6 9.9 7 N D 8 9.9 7 N D 8 9.9 7 N D 8 9.9 7 N D 8 9.9 7 N D 7.0 7 N D 8 8 9.9 7 N D 7.0 | 5 N D 0 8 8.5 5 N D 0 9.9 5 N D 2 9.9 5 N D 6 9.9 5 N D 6 9.9 5 N D 6 9.9 5 D E 0 10.2 5 D E 14 5.9 5 D E 20 5.9 5 N E 14 7.0 | , c | | | | | | | | | | | | | | 0 | 0 |
| 5 N D 0 9.9 5 N D 2 9.9 5 N D 6 9.9 5 N D 6 9.9 5 N D 6 9.9 5 N D 7.0 6 N D 7.0 | 5 N D 0 9 9 9 122 122 122 122 122 122 122 122 1 | , c | | | | | | | | | | | | | | 0 | 0 |
| 5 N D 2 9.9 122 122 122 5 N D 6 9.9 122 122 5 N D 6 9.9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 5 N D 2 9.9 122 122 5 N D 6 9.9 122 122 5 N D 6 9.9 122 122 5 N D 6 9.9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 2 | | | | | | | | | | | | | | 0 | 0 |
| 122 5 N D 6 9.9 5 N D 6 9.9 5 N D 7.0 5 N D 7.0 6 D E 14 5.9 6 D E 14 5.9 7 N E 14 7.0 8 N E 14 7.0 | 122 5 N D 6 9.9 5 N D 6 9.9 5 N D 8 9.9 5 D E 0 10.2 5 D E 14 5.9 5 D E 20 5.9 5 N E 0 10.1 5 N E 14 7.0 | 2 | | | | | | | | | | | | | | 0 | 0 |
| 5 N D 6 9.9 5 N D 8 9.9 5 D E 0 10.2 5 D E 14 5.9 5 D E 20 5.9 5 N E 8 10.1 5 N E 14 7.0 | 5 N D 6 9.9 5 N D 8 9.9 5 D E 0 10.2 5 D E 14 5.9 5 N E 14 7.0 5 N E 20 7.0 | : Z | | | | 122 | | | | | | | | | | 122 | 0 |
| 5 N D 8 9.9 5 D E 0 10.2 5 D E 14 5.9 5 D E 20 5.9 5 N E 0 10.1 5 N E 14 7.0 5 N E 20 7.0 | 5 N D 8 9.9 5 D E 8 10.2 5 D E 14 5.9 5 D E 20 5.9 5 N E 8 10.1 5 N E 14 7.0 | . z | | | | | | | | | | | | | | 0 | 0 |
| 5 D E 0 10.2 5 D E 8 10.2 5 D E 14 5.9 5 D E 20 5.9 5 N E 0 10.1 5 N E 14 7.0 5 N E 20 7.0 | 5 D E 0 10.2 5 D E 8 10.2 5 D E 14 5.9 5 D E 20 5.9 5 N E 0 10.1 5 N E 14 7.0 5 N E 20 7.0 | 2 Z | | | | | | | | | | | | | | 0 | 0 |
| 5 D E 8 10.2 5 D E 14 5.9 5 D E 20 5.9 5 N E 0 10.1 5 N E 14 7.0 5 N E 20 7.0 | 5 D E 8 10.2 5 D E 14 5.9 5 D E 20 5.9 5 N E 0 10.1 5 N E 14 7.0 5 N E 20 7.0 | | + | | | | | | | | | | | | | c | С |
| 5 D E 14 5 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 5 D E 14 5 5 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | | 2 5 | | | | | | | | | | | | | 0 | 0 |
| 5 N E 0 10.1 5 N E 14 7.0 5 N E 20 7.0 | 5 N E 20 7.0 5 N E 14 7.0 5 N E 20 7.0 | טת סכ | מ כ | | | | | | | | | | | | | o C | C |
| 5 N E 0 10.1 55 N E 8 10.1 55 N E 14 7.0 56 N E 20 7.0 | 75 N E 8 10.1 75 N E 8 10.1 75 N E 14 7.0 75 N E 20 7.0 | 75 0 1 | ט נ | | | | | | | | | | | | | o C |) C |
| 5 N E 8 10.1 5 N E 14 7.0 5 N E 20 7.0 | 75 N E 9 10.1 75 N E 14 7.0 75 N E 20 7.0 | 2 | , | | | | | | | | | | | | | o c | · C |
| 5 N E 14 7.0 5 N E 20 7.0 | 5 N E 14 7.0 5 N E 20 7.0 | ນ ເ ຂ : ພ ເ | 2 9 | | | | | | | | | | | | , | o c | 0 0 |
| 5 N E 14 7.0 5 N E 20 7.0 | 5 N E 20 7.0 | נט 2 : 1 ה | 2 1 | | | | | | | | | | | | | · • | 0 0 |
| 5 N E 20 7.0 | 5 N E 20 7.0 | ا سا د کا | - 1 | | | | | | | | | | | | | > (| 0 (|
| | | N N | 7 | | | | | | | | | | | | | 0 | 0 |

Appendix 8. Continued.

| Sample Parameter | ers | | | | | Sp | Species/Groups | Groups | 40 | | | | | | |
|------------------|------|----|----|-----|----|----|----------------|--------|----|----|----|----|-------|-----------------|---------------|
| Date D1 Sta Opt | Temp | AL | SP | W.S | d۶ | ₽ | 9 | CP | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| | | | | | | | | | | | | | | | |
| -14-75 D G | | | | | | | | | | | | | | 0 | 0 |
| -14-75 D G | | | | 62 | | | | | | | | | | 62 | 0 |
| -14-75 D G | | | | 65 | | | | | | | | | | 65 | 0 |
| -14-75 D G | • | | | | | | | | | | | | | 0 | 0 (|
| -14-75 N G | | | | | | | | | | | | | | 0 | 0 (|
| -14-75 N G | | | | | | | | | | | | | | 0 | 0 (|
| 5-14-75 N G 4 | 9.8 | | | | | | | | | | | | | 0 (| 0 0 |
| -14-75 N G | | | | | | | | | | | | | | > | > |
| | | | | | | | | | | | | | | c | c |
| -14-75 D H | | | | | | | | | | | | | | 2 | 0 |
| -14-75 D H | • | | | 54 | | | | | | | | | | υ r 4 t | 0 |
| -14-75 D H | • | | | 21 | | | | | | | | | | 2, | > (|
| -14-75 D H | | | | | | | | | | | | | | o (| 0 (|
| -14-75 D H | | | | | | | | | | | | | | o (|) |
| -14-75 N H | | | | | | | | | | | | | | 0 (| o (|
| -14-75 N H | | | | | | | | | | | | | | 0 |) |
| 5-14-75 N H 4 | 8.8 | | | | | | | | | | | | | 0 (| o (|
| -14-75 N H | | | | | | | | | | | | | |) |) |
| -14-75 N H | | | | | | | | | | | | | | 0 | > |
| 1 | | | | 000 | | | | | | | | | | 208 | 0 |
| -14-/5 U K | | | | 100 | | | | | | | | | | 126 | 0 |
| -14-/5 U K | | | | 07 | | | | | | | | | | 0 | 0 |
| - 14-75 U R | | | | 707 | | | | | | | | | | 424 | 0 |
| -14-/5 U K | | | | 177 | | | | | | | | | | 189 | 0 |
| -15-75 N R | | | | 0 0 | | | | | | | | | | 594 | 66 |
| -15-75 N R | | | | 900 | | | | | | | | | | c | C |
| 5-15-75 N R 4 | 9 (| | | | | | | | | | | | | 0 | 0 |
| -12-12 N K | • | | | | | | | | | | | | | • | |
| -13-75 D W | - | | | | | | | | | | | | | 0 | 0 |
| -13-75 D W | = | | | | | | | | | | | | | 0 | 0 |
| 5-13-75 D W 14 | 0.6 | | | | | | | | 52 | | | | | 52 | 0 |
| -13-75 D W | נט | | | | | | | | | | | | | 0 | 0 |
| - 13 - 75 N W | | | | | | | | | | | | | | 0 | 0 |
| - 13-75 N W | | | | | | | | | | | | | | 0 | 0 |
| -13-75 N W | . 4 | | | | | | | | | | | | | 0 | 0 |
| -13-75 N W | 4 | | | | | | | | | | | | | 0 | 0 |
| | • | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

Appendix 8. Continued.

| OD TP UD | | AL 54 310 | Temp Dpt C AL |
|----------|-----|-----------------|------------------------------|
| | 33 | | |
| | 93 | | 17. |
| | 93 | | 16. |
| | 33 | | 15.7 |
| | 33 | | 9.5 |
| | | | 15.4 100 |
| | 44 | | 14.9 |
| | 44 | | 572 |
| | | 150 | 8.5 |
| | | 80 | 16.2 |
| | | i | 1 - 1 |
| | | 42 | 15.0 |
| | | 100 | |
| | | 742 | 2.0 |
| | 37 | 1 10 | 10.7 10.7 10.7 10.7 |
| | | 2 6 | 14.4 |
| | 40 | 8 8 | 13 5 488 |
| | 98 | 172 86 | 172 |
| | 112 | | 8.5 |
| | | | ! |
| | | 160 | 16.7 |
| | | 40 | 16.3 |
| | | | <u>.</u> 0 |
| | | c c | |
| | | 5.0 | 0.6 |
| | | 2 | . 0 |
| | | | 14 13.0 20 8.0 |
| | | | |
| | | den den | 5.9 |
| | | 46 | 15.4 |
| | | 347 | 11.5 |
| | | 975 | £ 0± |
| | | 975 | - C- |
| | | | 2 4 |
| | | 990 | 0.0 |
| | | 212 | و. 9 |
| | | 112 | 0.8 |

Appendix 8. Continued.

| Dp | Temp | AL | SP | SM | <u>۸</u> | 4 | 9 | CP | BR | 88 | N S | FS | Misc. | Total Larvae | Eggs |
|----------|-------------|----------|-----|----|----------|---|---|----|----|----|--------|----|-------|-----------------|--------|
| 1 0 | 1 2 | 0 | | | | | | | | | | | | 916 | |
| 0 | 16.2 | 373 | | | | | | | | | | | | 373 | 0 |
| 4 | 13 | 2 | | | | | | | | | | | | 526 | 0 |
| 9 | о О | 2 | | | | | | | | | | | | 247 | 0 |
| æ | о О | - | | | 45 | | | | | | | | | 189 | 96 |
| 0 | 44 | S | | | 9/ | | | | | | | | | 646 | 912 |
| 7 | = | က | | | | | | | | | | | | 384 | 128 |
| 4 | 80 | ญ | | | | | | | | | | | | 541 | 41 |
| 9 | 7. | | | | | | | | | | | | | 4 1 | 125 |
| æ | 7. | | | | | | | | | | | | | 0 | 610 |
| | | | | | | | | | | | | | | | |
| 0 | 7 | 135 | | | | | | | | | | | | 135 | 0 |
| 7 | | | | | | | | | | | | | | 0 | 100 |
| 4 | • | - | | | | | | | | | | | | 118 | 237 |
| 9 | • | | | | | | | | | | | | | 42 | 423 |
| 0 | • | 2 | 2 | | | | | | | | | | | 330 | 0 |
| 7 | 16.5 | 169 | 253 | | | | | | | | | | | 422 | 932 |
| 4 | • | 7 | 45 | | | | | | | 44 | | | | 315 | 407 |
| ဖ | | | | | | | | | | | | | | 09 | 0 |
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| ٥ د | | • | | | | | | | | | | | | > C | |
| ٠; | 9 1 | | | | | | | | | | | | | 0 | |
| - 6 | <u>.</u> | | | | | | | | | | | | | O | |
| 2 | ! | | | | ţ | | | | | | | | | 9 5 | |
| O | _ : | | | | 7.7 | | | | | | | | | 77 |) (|
| Σ . | <u>.</u> | | | | | | | | | | | | | - n | ה ה |
| 20 | 14.5 8.3 | 92 32 | | | | | | | | | | | | 92 32 | r Or |
| | | | | | | | | | | | | | | | |
| 0 | 23 | | | | | | | | | | | | | 409 | 0 |
| 7 | 23. | == | | | | | | | | | | | | 11159 | 0 |
| 4 | 23. | 69 | | | | | | | | | | | | 6994 | 0 |
| 9 | 23 | 27 | | | | | | | | | | | | 2776 | 0 |
| 0 | 22 | 18 | 28 | | | | | 28 | | | | | | 1906 | 7744 |
| C | 22 | 20 | | | | | | | | | | | | 2268 | 30 |
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Appendix 8. Continued.

| 0 23.7 28 | Det C AL SP SM YP TP JD CP BR SS NS FS MISC. Lt 1876 23.7 28 24.5 37.2 24.0 | Det Temp C 23.7 28 | Det C AL SP SM YP TP UD CP BR SS NS F5 MISc. Lt. 2 MISc. Lt. 2 MISc. Lt. 3 MIS | ample Paramet | ers | | | | | Şr | Species/Groups | 'Group: | (A | | | | | 3 |
|--|--|--|--|---------------|------------|--------|-----|----|--------|----|----------------|---------|----|----|----|-------|----------|-------------|
| 28. 23.7 28 4 24.6 24.5 28 24.6 24.5 28 24.6 24.6 24.6 24.6 24.6 24.6 24.6 24.6 | 23.7 28 24.5 30.3 38 24.6 30 24.0 30 24.0 30 24.0 30 25.1 372 25.2 29 25.2 1957 25.2 29 25.2 1958 25.3 3489 | 23.7 28 23.4 5 23.4 30 23.4 30 4 23.2 372 6 10.0 87 756 87 8 10.2 756 8 23.2 29 8 22.2 1957 8 22.2 29 8 22.0 54 8 22.0 54 8 22.0 54 8 22.0 54 9 22.0 54 10 53 20 52 21 55 22 54 23 3489 24 23.1 25 54 26 5739 27 5739 28 22.0 29 5739 20 5739 20 5739 21 5739 22 5739 23 5739 24 22.1 25 5739 26 5739 27 40 28 5739 29 5739 20 5739 21 5739 22 5739 22 | 0 23.7 28 2 23.3 1876 2 23.3 1876 2 23.4 1876 2 12.2 372 2 22.7 3827 2 22.7 3827 2 22.7 3827 2 22.7 3827 2 22.7 3827 2 22.8 1957 2 22.8 1957 2 22.9 29 2 22.1 5739 2 22.1 5739 2 22.1 5739 2 22.2 4558 2 22.2 4558 2 22.3 15739 2 22.2 558 2 22.3 15739 2 22.2 558 2 22.3 15739 2 22.3 15739 2 22.1 1315 2 22.2 41345 2 22.3 16345 2 22.3 | а Ор | - | AL | SP | SM | γÞ | 41 | 9 | GP | BR | SS | NS | Misc. | Total | Eggs |
| 2 24.5 2 24.5 4 25.2 4 15.0 8 15.0 8 15.0 8 15.0 8 15.0 8 15.0 8 15.0 8 23.2 9 22.7 9 22.7 9 22.8 1 156 1 2 2.1 2 2 2.1 2 2 2.2 2 2 2.3 1 2 2.2 2 2 2.0 1 2 2.0 2 2 3.0 2 3 4 4 2 2 3.0 3 4 4 4 2 2 3.0 3 4 4 5.0 | 24.5 24.5 24.6 24.0 24.0 24.0 25.1 25.1 25.2 25.6 25.6 25.6 25.6 25.6 25.6 25.7 25.8 25.7 25.8 25.9 25.9 25.9 25.9 25.9 25.9 25.9 25.9 | 2 24.5 2 24.5 2 24.0 2 24.0 3 2 24.0 4 23.2 6 10.0 8 10.0 9 22.1 9 22.7 1 156 8 22.2 1 156 8 22.2 1 156 8 22.2 1 156 2 2.1 2 2.2 1 156 2 2.2 2 2.2 2 2.2 2 2.2 2 2.2 2 2.3 3 3 3 3 2.0 4 2.2 5 4 2.1 5 5 6 2.2 6 2.2 7 2.2 8 2.2 8 2.2 9 2.0 10 </td <td>2 23.5 1876 4 22.5 23.7 1876 6 10.0 29 8 23.2 756 8 23.2 22.7 3927 2 22.7 3927 2 22.7 3927 2 22.7 3927 2 22.7 3927 2 22.7 3927 2 22.8 29 8 22.2 55 8 22.2 55 8 22.2 55 8 22.2 55 8 22.2 55 8 22.3 1 5739 4 22.2 55 6 22.9 155 7 7 7 0 23.4 157 0 23.5 165 6 22.9 165 7 7 7 0 23.6 1767 0 23.6 1767 0 23.6 1767 0 23.6 1767 0 23.6 1767 0 23.6 1767 0 23.8 2885 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.8 2885</td> <td></td> <td>ω.</td> <td>28</td> <td></td> <td>28</td> <td> 0</td> | 2 23.5 1876 4 22.5 23.7 1876 6 10.0 29 8 23.2 756 8 23.2 22.7 3927 2 22.7 3927 2 22.7 3927 2 22.7 3927 2 22.7 3927 2 22.7 3927 2 22.8 29 8 22.2 55 8 22.2 55 8 22.2 55 8 22.2 55 8 22.2 55 8 22.3 1 5739 4 22.2 55 6 22.9 155 7 7 7 0 23.4 157 0 23.5 165 6 22.9 165 7 7 7 0 23.6 1767 0 23.6 1767 0 23.6 1767 0 23.6 1767 0 23.6 1767 0 23.6 1767 0 23.8 2885 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.9 1654 0 22.8 2885 | | ω. | 28 | | | | | | | | | | | 28 | 0 |
| 2 23.3 1876 2 24.0 372 4 15.0 372 4 15.0 372 6 23.2 372 8 23.2 22.7 9 22.7 5880 2 22.7 5880 4 22.5 1957 4 22.5 1957 5 22.0 202 14 22.2 23 14 22.2 55 2 23.3 3489 2 23.1 53.2 2 23.1 53.2 2 23.1 53.2 2 23.1 53.2 2 23.1 53.2 2 23.1 53.2 2 23.1 53.2 2 23.1 53.2 4 23.1 109 2 23.2 145.7 4 23.9 23.2 4 23.1 109 5 23.2 145.7 6 22.5 33.2 6 23.5 33.2 6 23.5 33.2 6 23.5 33.2 <tr< td=""><td>23.3 1876 23.2 2 372 4.0 0 87 10.0 0</td><td>2 2.3.3 1876 2 2.4.0 372 4 15.0 372 4 15.0 372 4 15.0 372 4 15.0 22 8 23.2 756 8 23.2 1927 9 22.1 1937 33 9 22.2 1957 202 14 22.2 29 1156 14 22.2 29 22 14 22.2 29 20 14 22.2 54 54 14 23.3 3489 27 15 22.1 130 3528 16 22.2 42.1 130 17 3524 109 3524 16 22.1 1457 105 17 12.2 12.2 1457 18 22.2 22.2 42.2 12.2 18 22.2 42.2 12.2 12.2 18 22.2 42.2 12.2 12.2 18 22.2 42.2 12.2 12.2 18 22.2 42.2 12.2 12.2</td><td>2 23.3 1876 4 15.0 2 31.2 4 15.0 2 31.2 6 10.0 2 31.2 7 5880 6 22.7 5880 6 22.7 1957 33 33 7 772 7 772 7 772 7 772 7 7 772 7 7 7 7</td><td></td><td>4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0</td><td>0</td></tr<> | 23.3 1876 23.2 2 372 4.0 0 87 10.0 0 | 2 2.3.3 1876 2 2.4.0 372 4 15.0 372 4 15.0 372 4 15.0 372 4 15.0 22 8 23.2 756 8 23.2 1927 9 22.1 1937 33 9 22.2 1957 202 14 22.2 29 1156 14 22.2 29 22 14 22.2 29 20 14 22.2 54 54 14 23.3 3489 27 15 22.1 130 3528 16 22.2 42.1 130 17 3524 109 3524 16 22.1 1457 105 17 12.2 12.2 1457 18 22.2 22.2 42.2 12.2 18 22.2 42.2 12.2 12.2 18 22.2 42.2 12.2 12.2 18 22.2 42.2 12.2 12.2 18 22.2 42.2 12.2 12.2 | 2 23.3 1876 4 15.0 2 31.2 4 15.0 2 31.2 6 10.0 2 31.2 7 5880 6 22.7 5880 6 22.7 1957 33 33 7 772 7 772 7 772 7 772 7 7 772 7 7 7 7 | | 4 | | | | | | | | | | | | 0 | 0 |
| 2 2 3.0 4 23.2 30 6 15.0 87 6 15.0 87 6 15.0 1756 8 10.0 29 9 22.7 1980 22.9 9 22.7 1957 33 33 9 22.8 1957 33 39 10 22.8 195 20 10 22.8 29 172 10 22.0 130 33 33 10 22.0 130 130 130 10 22.0 130 24 130 10 22.1 130 348 32 10 22.1 1457 1457 10 22.1 1457 1457 10 22.2 1457 1457 10 22.2 1457 1457 10 22.2 1457 1457 10 22.2 1457 1457 10 22.2 1457 1457 10 22.2 144 1664 10 1457 1457 1457 10 1457 1457 <td>24.0 30 21.0 87 15.0 87 16.0 29 23.2 756 22.7 18680 22.7 18680 22.1 1957 22.8 55 22.0 130 23.1 5739 23.1 5739 22.0 4578 22.9 654 22.0 4564 22.1 6694 22.9 6694</td> <td>2 2 30 4 23.2 30 6 15.0 87 6 10.0 29 8 10.0 29 8 22.1 22 8 22.1 30 9 22.1 30 10 22.2 33 10 22.2 33 10 22.2 33 10 32.2 33 10 32.2 33 10 32.2 33 10 32.2 33 10 32.2 34 10 32.2 34 10 32.2 34 11 32.2 34 12 32.3 348 13 34.2 34 14 31.1 34.2 15 32.2 34.2 16 32.2 34.2 17 32.2 34.2 18 34.2 34.2 19 34.2 34.2 10 34.2 34.2 10 34.2 34.2 10 34.2 34.2 10 34.2 34.2 10<!--</td--><td>2 24.0 30 4 15.0 87 6 10.0 2.3 8 23.2 756 8 10.2 22 2 2.7 3927 6 22.5 1957 6 22.8 29 14 22.2 59 14 22.2 59 16 22.0 130 2 2.1 573 6 22.9 24 7 77 8 22.0 54 8 22.0 4578 6 22.9 1654 7 3524 109 6 22.9 1664 7 17 8 22.0 6458 8 22.0 4578 9 22.9 1664 9 22.9 1654 9 22.9 1654</td><td></td><td>ო .</td><td>œ</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1876</td><td>0</td></td> | 24.0 30 21.0 87 15.0 87 16.0 29 23.2 756 22.7 18680 22.7 18680 22.1 1957 22.8 55 22.0 130 23.1 5739 23.1 5739 22.0 4578 22.9 654 22.0 4564 22.1 6694 22.9 6694 | 2 2 30 4 23.2 30 6 15.0 87 6 10.0 29 8 10.0 29 8 22.1 22 8 22.1 30 9 22.1 30 10 22.2 33 10 22.2 33 10 22.2 33 10 32.2 33 10 32.2 33 10 32.2 33 10 32.2 33 10 32.2 34 10 32.2 34 10 32.2 34 11 32.2 34 12 32.3 348 13 34.2 34 14 31.1 34.2 15 32.2 34.2 16 32.2 34.2 17 32.2 34.2 18 34.2 34.2 19 34.2 34.2 10 34.2 34.2 10 34.2 34.2 10 34.2 34.2 10 34.2 34.2 10 </td <td>2 24.0 30 4 15.0 87 6 10.0 2.3 8 23.2 756 8 10.2 22 2 2.7 3927 6 22.5 1957 6 22.8 29 14 22.2 59 14 22.2 59 16 22.0 130 2 2.1 573 6 22.9 24 7 77 8 22.0 54 8 22.0 4578 6 22.9 1654 7 3524 109 6 22.9 1664 7 17 8 22.0 6458 8 22.0 4578 9 22.9 1664 9 22.9 1654 9 22.9 1654</td> <td></td> <td>ო .</td> <td>œ</td> <td></td> <td>1876</td> <td>0</td> | 2 24.0 30 4 15.0 87 6 10.0 2.3 8 23.2 756 8 10.2 22 2 2.7 3927 6 22.5 1957 6 22.8 29 14 22.2 59 14 22.2 59 16 22.0 130 2 2.1 573 6 22.9 24 7 77 8 22.0 54 8 22.0 4578 6 22.9 1654 7 3524 109 6 22.9 1664 7 17 8 22.0 6458 8 22.0 4578 9 22.9 1664 9 22.9 1654 9 22.9 1654 | | ო . | œ | | | | | | | | | | | 1876 | 0 |
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| 6 10.0 6 6 10.0 756 756 756 756 756 756 756 756 756 756 | 10.0 10.0 10.0 23.2 22.7 22.7 22.7 22.6 1957 22.8 22.2 22.2 22.0 130 22.1 23.3 23.3 23.4 23.4 23.5 23.6 177 23.3 23.4 23.5 23.6 23 | 6 10.0 76 6 10.0 76 76 76 76 76 76 76 76 76 76 76 76 76 | 6 10.0 6 23.2 756 8 23.2 251 2 22.7 5880 4 22.5 1957 33 33 6 22.0 1156 8 22.2 29 14 22.1 558 16 22.0 130 17 72 20 23.3 3489 6 22.9 372 6 22.9 372 6 22.9 373 6 22.9 373 6 22.9 4578 73 6 22.9 3573 6 22.9 3573 6 22.9 3573 6 22.9 3573 7 7 7 9525 8 22.0 1594 8 22.1 5739 9 22.9 1457 1099 9 22.9 652 9 22.9 652 9 22.9 652 9 22.9 653 8 22.1 131 9 22.1 131 9 22.1 131 9 22.1 131 9 22.1 131 9 22.1 131 9 22.1 131 9 22.1 131 | | 2 | 87 | | | | | | | | | | | 87 | 0 |
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| 6 22.5 652 8 22.5 444 0 22.8 2885 27 2912 2 22.4 1345 4 22.1 1131 6 21.6 661 | 22.5 339 22.5 444 22.8 2885 27 22.4 1345 21.9 532 21.6 661 | 6 22.5 339 652 839 8 22.5 339 8 22.5 339 8 22.5 8 2885 27 22.4 1345 131 131 6 21.9 532 8 21.6 661 | 6 22.5 339 8 22.5 444 0 22.8 2885 27 2 22.4 1345 4 22.1 1131 6 21.9 532 8 21.6 661 | | |) (| | | | | | | | | | | 1694 | 0 |
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| 4 22.1 1131 6 21.9 532 8 21.6 66.1 | 22 1 1131 21.9 532 21 6 661 | 4 22.1 1131 6 21.9 532 8 21.6 661 661 | 4 22 1 1131 6 21.9 532 8 21.6 661 | | 2 | C | | | | | | | | | | | 4245 | 0 |
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| | | | | | _ | 66.1 | | | | | | | | | | | 1 0 | 0 |

Appendix 8. Continued.

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Appendix 8. Continued.

| Sample Parameter | ters | | | | | S, | Species/Groups | Group | S | | | | | | |
|---|--------|---------|----|-----|----|----|----------------|-------|----|----|----|----|-------|-----------------|---------------|
| Date D1 Sta Dp | Temp | AL | SP | WS. | ΥP | 47 | O. | СР | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| | | | | | | | | | | | | | | | |
| -12-75 D E | 23. | 175 | | | | | | | | | | | | 1/5 | > 0 |
| -12-75 D E | 14 | | | | | | | | | | | | | > (|) |
| -12-75 D E | о О | | | | | | | | | | | | | 0 (| 0 (|
| -12-75 D E | ნ | | | | | | | | | | | | | 0 ! | O (|
| -13-75 N E | 22. | 150 | | | | | | | | | | | | 150 | 0 (|
| -13-75 N E | 4 | 42 | | | | | | | | | | | | 42 | 0 (|
| 8-13-75 N E 14 | 0 | 42 | | | | | | | | | | | | 42 | 0 (|
| -13-75 N E | თ | 27 | | | | | | | | | | | | 7 | > |
| 1 | ć | 76 | | | | | | | | | | | | 46 | 0 |
| -12-75 0 6 | 7 6 | 4 C | | | | | | | | | | | | 88 | 0 |
| -12-75 D G | 4.0 | 90 | | | | | | | | | | | |) C | 0 |
| -12-75 D G | 22. | | | | | | | | | | | | | C | 0 |
| 8-12-75 U G E | 22.5 | 777 | | | | | | | | | | | | 644 | 0 |
| -12-/5 N G | 5, 6 | 4 6 | | | | | | | | | | | | 468 | 0 |
| -12-75 N G | 23. | 468 | | | | | | | | | | | | 220 | C |
| -12-75 N G | 23. | 220 | | | | | | | | | | | | 230 | c |
| -12-75 N G | 21. | 230 | | | | | | | | | | | |) N | |
| 75 0 37 0 1 | 23 | 217 | | | | | | | | | | | | 217 | 0 |
| -12-75 D H | 3 6 | | | | | | | | | | | | | 0 | 0 |
| 1 0 6/-21- | | | | | | | | | | | | | | 0 | 0 |
| -12-75 D H | | | | | | | | | | | | | | 0 | 0 |
| -12-75 D H | . 6 | | | | | | | | | | | | | 0 | 0 |
| -10-75 N H | 03 | 207 | | | | | | | | | | | | 207 | 0 |
| -12-75 N H | 23 | 191 | | | | | | | | | | | | 161 | 0 |
| -12-75 N H | 22 | 140 | | | | | | | | | | | | 140 | 0 |
| -12-75 N H | 22 | 84 | | | | | | | | | | | | 84 | 0 |
| 12-75 N H | 8 21.0 | 21 | | | | | | | | | | | | 21 | 0 |
| 0 0 25-01- | 2,5 | r, a | | | | | | | | | | | | 58 | 0 |
| A 0 67-21- | | 3 6 | | | | | | | | | | | | 32 | 0 |
| - 12-75 D B | . 6 | 1 | | | | | | | | | | | | 0 | 0 |
| X 0 0 1 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 | | | | | | | | | | | | | | 0 | 0 |
| 0-12-75 U R | 24.0 | 302 | | | | | | | | | | | | 302 | 0 |
| | | 020 | | | | | | | | | | | | 629 | 0 |
| 7 2 10 - CT | 3 6 | 414 | | | | | | | | | | | | 414 | 0 |
| K N 0/-01- | , , | ניני | | | | | | | | | | | | 529 | 0 |
| -13-75 N K | . 7 | 670 | | | | | | | | | | | | 1 | |
| | | | | | | | | | | | | | | | |

Appendix 8. Continued.

| Sample Parameters | | | | | ัง | Species/Groups | /Group | v | | | | | | |
|--|------------|----|----|----|-----|----------------|--------|----|----|---------|----|--------|-----------------|--|
| Temp Date D1 Sta Dpt C | AL | SP | SM | γP | 1.0 | 9 | CP | BR | 88 | NS S | FS | M tsc. | Total Larvae | Eggs |
| -12-75 D W O 24. | | | | | | | | | | | | | C | 0 |
| -12-75 D W 8 23. | | | | | | | | | | | | | 0 | 0 |
| -12-75 D W 14 9. | | | | | | | | | | | | | 0 | 0 |
| -12-75 D W 20 9. | | | | | | | | | | | | | 0 | 0 |
| 8-12-75 N W 0 24.0 8-12-75 N W 8 23.2 | 62 28 | | | | | | | | | | | | 62 | 00 |
| -12-75 N W 14 9. | 9 | | | | | | | | | | | | 0 C | o c |
| -12-75 N W 20 9. | | | | | | | | | | | | | 0 | 0 |
| -10-75 D C 0 21. | | | | | | | | | | | | | c | c |
| -09-75 D C 2 19. | | | | | | | | | | | | | 0 | 0 |
| -75 D C 4 19. | | | | | | | | | | | | | 0 | 0 |
| -09-75 D C 6 19. | Ċ | | | | | | | | | | | | 0 | 0 |
| -11-75 N C O 19. | 21 | | | | | | | | | | | | 21 | 0 |
| -11-75 N C 2 19. | 90 | | | | | | | | | | | | 90 | 0 0 |
| -11-75 N C 6 | . <u>0</u> | | | | | | | | | | | | 100 | 0 |
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| -10-75 D D O 20. | | | | | | | | | | | | | 0 | 0 |
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| -10-75 D D 6 19. | | | | | | | | | | | | | o c | 0 |
| -10-75 D D 8 18. | | | | | | | | | | | | | 0 | 0 |
| -11-75 N D 0 19. | 34 | | | | | | | | | | | | 34 | 0 |
| -11-75 N D 2 19. | 91 | | | | | | | | | | | | 91 | 0 |
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| -10-75 D E 14 18. | | | | | | | | | | | | | 0 | o C |
| -10-75 D E 20 18. | | | | | | | | | | | | | 0 | 0 |
| -10-75 N E O 18. | | | | | | | | | | | | | 0 | 0 |
| 9-10-75 N E 8 18.4 | 32 | | | | | | | | | | | | 32 | 0 |
| -10-75 N E 14 18. | | | | | | | | | | | | | 0 | 0 |
| -10-75 N E 20 18. | | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | The state of the s |

Appendix 8. Continued.

| Sample Para | arameter | ers | | | | | ζŚ | Species/Groups | /Group | ري ن | | | | | | |
|-------------|--------------|------|-----|----|-----|----|----|----------------|--------|---------|----|----|----|-------|-----------------|---------------|
| Date DI Sta | Dpt | Temp | AL | SP | SMS | Αγ | TP | 9 | CP | BR | SS | SZ | FS | Misc. | Total Larvae | Eggs |
| 100 | | 0 | | | | | | | | | | | | | C | 0 |
| -10-75 | ָ פֿ | • | | | | | | | | | | | | | 0 0 | o c |
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| -10-75 N | 0 | | | | | | | | | | | | | | 0 | 0 |
| 0 | 7 | 19.5 | | | | | | | | | | | | | 0 | 0 |
| -10-75 N | 4 | • | 30 | | | | | | | | | | | | 30 | 0 |
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| 9-10-75 D R | ~ | 0.61 | 36 | | | | | | | | | | | | 36 | 0 |
| -10-75 D | 4 | | | | | | | | | | | | | | 0 | 0 |
| -10-75 D | 9 | • | | | | | | | | | | | | | 0 | 0 |
| -11-75 N | 0 | • | | | | | | | | | | | | | 0 | 0 |
| -11-75 N | 7 | • | 99 | | | | | | | | | | | | 99 | 0 |
| -11-75 N | 4 | | 54 | | | | | | | | | | | | 54 | 0 |
| -11-75 N | 9 | • | 68 | | | | | | | | | | | | 68 | 0 |
| -10-75 D | 0 | | | | | | | | | | | | | | 0 | 0 |
| -10-75 D | œ | | | | | | | | | | | | | | 0 | 0 |
| -10-75 D | 14 | | | | | | | | | | | | | | 0 | 0 |
| 9-10-75 D W | 50 | 13.1 | | | | | | | | | | | | | 0 | 0 |
| -10-75 N | 0 | • | | | | | | | | | | | | | 0 | 0 |
| - 10-75 N | œ | | | | | | | | | | | | | | 0 | 0 |
| -10-75 N | 14 | | | | | | | | | | | | | | 0 | 0 |
| -10-75 N | 20 | | | | | | | | | | | | | | 0 | 0 |
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Appendix 8. Continued.

| | Eggs | 0000000 | 000000000 | 0000 | 0000000 | 000000000 |
|----------------|-----------------|--|--|-------------------------------|--|--|
| | Total Larvae | 00000000 | 000000000 | 0000 | 00000040 | 000000000 |
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| | SS | | | | | |
| v | BR | | | | | |
| Species/Groups | CP | | | | | |
| cies/ | 9 | | | | | |
| Spe | | 8 | • | | | |
| | 41 | 33 | | | | |
| | ΥP | | | | | |
| | WS. | | | | | |
| | SP | | | | | |
| | AL | | | | 54 | |
| ers. | Temp | 15.9 15.9 15.9 15.0 15.0 | 6 6 6 7 7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 2. 41 2. 2. 41 2. 2. 41 | 15.1 15.1 15.1 15.1 14.7 14.5 | 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 |
| Parameter | Opt | 00400040 | 0040000400 | 0 4 1 20 | 00400040 | 004000400 |
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Appendix 8. Continued.

| Date Di Sta Dpt C AL SP SM YP TP UD CP BR SS NS FS Misc. Larvae Eggs Color | Date DI Sta Dpt C AL SP SM YP TP JD CP BR SS NS FS MISC. Larvae Egg (10-14-75 D R 0 15.8 R 15.8 R 15.8 R 15.8 R 15.8 R 15.8 R 15.6 R 15.6 R 15.6 R 15.6 R 15.6 R 15.6 R 15.6 R 14.7 R 14.1 R 14 | Sample Parameter | er s | | | | | Sp | Species/Groups | Group | ro. | | | | | | |
|--|--|----------------------------|-----------|----|----|----|----|----|----------------|-------|-----|-----|----|----|-------|-----------------|------|
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| 15 15 15 15 15 15 15 15 | 00-16-75 D R 2 15-8 00-16-75 N R 2 15-8 00-16-75 N R 2 15-8 00-16-75 N R 2 15-0 00-16-75 N R 2 14-7 00-16-75 N R 2 14-7 00-16-75 N R 2 14-7 00-16-75 N R 2 14-7 00-16-75 N R 2 14-7 00-16-75 N R 2 14-7 00-16-75 N R 2 14-7 00-16-75 N R 2 14-7 00-16-75 N R 20 14-3 00-16-75 N R 2 14-7 00-16 | -14-75 D R | 5. | | | | | | | | | | | | | 0 | ° |
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| 11-06-75 D C 0 13.2 11-06-75 D C 2 13.2 11-06-75 D C 4 12.4 11-05-75 N C 0 12.9 11-05-75 N C 2 12.2 11-05-75 N C 4 12.2 11-06-75 D D 0 13.0 11-06-75 D D 0 13.0 11-06-75 D D 0 13.0 11-06-75 D D 0 13.0 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 | 11-06-75 D C 0 13.2 11-06-75 D C 2 13.2 11-06-75 D C 4 12.4 11-06-75 D C 6 12.9 11-05-75 N C 0 12.9 11-05-75 N C 2 12.2 11-05-75 N C 4 12.2 11-06-75 D D 0 13.0 11-06-75 D D 0 13.0 11-06-75 D D 4 13.0 11-06-75 D D 8 12.4 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 | 17-75 N W | • | | | | | | | | | | | | | 0 | 0 |
| 11-06-75 D C 2 13.2 11-06-75 D C 4 12.4 11-06-75 D C 6 12.4 11-06-75 N C 2 12.2 11-05-75 N C 4 12.2 11-05-75 N C 4 12.2 11-06-75 D D 0 13.0 11-06-75 D D 0 13.0 11-06-75 D D 8 12.4 11-06-75 D D 8 12.4 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 | 11-06-75 D C 2 13.2 11-06-75 D C 4 12.4 11-05-75 N C 0 12.9 11-05-75 N C 2 12.2 11-05-75 N C 4 12.2 11-05-75 N C 4 12.2 11-06-75 D D 0 13.0 11-06-75 D D 2 13.0 11-06-75 D D 4 13.0 11-06-75 D D 8 12.4 11-06-75 N D 0 13.2 11-05-75 N D 6 11.9 | 1-06-75 D C | | | | | | | | | | | | | | С | С |
| 11-06-75 D C 4 12.4 11-06-75 D C 6 12.4 11-05-75 N C 2 12.2 11-05-75 N C 2 12.2 11-05-75 N C 6 11.6 11-06-75 D D 0 13.0 11-06-75 D D 0 13.0 11-06-75 D D 0 13.0 11-06-75 D D 0 13.0 11-06-75 D D 0 13.0 11-06-75 D D 0 13.0 11-06-75 D D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 | 11-06-75 D C 4 12.4 11-06-75 D C 6 12.4 11-06-75 N C 2 12.2 11-05-75 N C 4 12.2 11-05-75 N C 6 11.6 11-06-75 D D 0 13.0 11-06-75 D D 0 4 13.0 11-06-75 D D 4 13.0 11-06-75 D D 8 12.4 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 | 1-06-75 D C | | | | | | | | | | | - | | | 0 | 0 |
| 11-06-75 D C 6 12.4 11-05-75 N C 0 12.9 11-05-75 N C 2 12.2 11-05-75 N C 4 12.2 11-06-75 D D 0 13.0 11-06-75 D D 0 13.0 11-06-75 D D 0 4 13.0 11-06-75 D D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 | 11-06-75 D C 6 12.4 11-05-75 N C 2 12.9 11-05-75 N C 2 12.2 11-05-75 N C 4 12.2 11-06-75 D D 0 13.0 11-06-75 D D 0 2 13.0 11-06-75 D D 6 12.4 11-06-75 D D 6 12.4 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-05-75 N D 6 11.9 | 1-06-75 D C | | | | | | | | | | | | | | 0 | 0 |
| 11-05-75 N C 0 12.9 11-05-75 N C 2 12.2 11-05-75 N C 2 12.2 11-05-75 N C 4 12.2 11-06-75 N C 6 11.6 11-06-75 D D 0 13.0 11-06-75 D D 4 13.0 11-06-75 D D 8 12.4 11-06-75 N D 0 13.2 11-06-75 N D 0 13.2 11-05-75 N D 0 13.2 | 11-05-75 N C 0 12.9 11-05-75 N C 2 12.2 11-05-75 N C 4 12.2 11-05-75 N C 6 11.6 11-06-75 D D 0 13.0 11-06-75 D D 0 13.0 11-06-75 D D 6 12.4 11-06-75 D D 6 12.4 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 11-05-75 N D 0 13.2 | 1-06-75 D C | | | | | | | | | | | | | | 0 | 0 |
| 11-05-75 N C 2 12.2 11-05-75 N C 4 12.2 11-05-75 N C 6 11.6 11-06-75 N C 6 11.6 11-06-75 D D 0 13.0 11-06-75 D D 4 13.0 11-06-75 D D 8 12.4 11-06-75 N D 0 13.2 11-05-75 N D 2 12.3 11-05-75 N D 6 11.9 | 11-05-75 N C 2 12.2 11-05-75 N C 4 12.2 11-06-75 N C 6 11.6 11-06-75 N C 6 11.6 11-06-75 D D 2 13.0 11-06-75 D D 4 13.0 11-06-75 D D 6 12.4 11-06-75 N D 6 12.4 11-06-75 N D 2 12.3 11-05-75 N D 6 11.9 | 1-05-75 N C | • | | | | | | | | | | | | | 0 | 0 |
| 11-05-75 N C 4 12.2 11-05-75 N C 6 11.6 11-06-75 N C 6 11.6 11-06-75 D D 2 13.0 11-06-75 D D 4 13.0 11-06-75 D D 6 12.4 11-06-75 D D 8 12.4 11-05-75 N D 0 13.2 11-05-75 N D 2 12.3 11-05-75 N D 6 11.9 | 11-05-75 N C 4 12.2 11-05-75 N C 6 11.6 11-06-75 N C 6 11.6 11-06-75 D D 2 13.0 11-06-75 D D 4 13.0 11-06-75 D D 6 12.4 11-06-75 N D 0 13.2 11-05-75 N D 4 12.2 11-05-75 N D 6 11.9 11-05-75 N D 6 11.9 | 1-05-75 N C | • | | | | | | | | | | | | | 0 (| 0 |
| 11-06-75 D D 0 13.0 11-06-75 D D 2 13.0 11-06-75 D D 4 13.0 11-06-75 D D 6 12.4 11-06-75 D D 8 12.4 11-05-75 N D 0 13.2 11-05-75 N D 2 12.3 11-05-75 N D 4 12.2 11-05-75 N D 6 11.9 | 11-06-75 D D 0 13.0 11-06-75 D D 2 13.0 11-06-75 D D 4 13.0 11-06-75 D D 6 12.4 11-06-75 D D 6 12.4 11-05-75 N D 0 13.2 11-05-75 N D 2 12.3 11-05-75 N D 6 11.9 11-05-75 N D 6 11.9 | 1-05-75 N C 1-05-75 N C | | | | | | | | | | | | | | 00 | 00 |
| 11-06-75 D D 2 13.0 11-06-75 D D 4 13.0 11-06-75 D D 6 12.4 11-06-75 D D 8 12.4 11-05-75 N D 0 13.2 11-05-75 N D 4 12.2 11-05-75 N D 6 11.9 | 11-06-75 D D 2 13.0 11-06-75 D D 4 13.0 11-06-75 D D 6 12.4 11-06-75 D D 8 12.4 11-05-75 N D 2 12.3 11-05-75 N D 4 12.2 11-05-75 N D 6 11.9 | 1-06-75 D D | ю | | | | | | | | | | | | | 0 | 0 |
| 11-06-75 D D 4 13.0 11-06-75 D D 6 12.4 11-06-75 D D 8 12.4 11-05-75 N D 0 13.2 11-05-75 N D 4 12.2 11-05-75 N D 6 11.9 | 11-06-75 D D 4 13.0 11-06-75 D D 6 12.4 11-06-75 D D 8 12.4 11-05-75 N D 2 12.3 11-05-75 N D 4 12.2 11-05-75 N D 6 11.9 | 1-06-75 D D | ю | | | | | | | | | | | | | 0 | 0 |
| 11-06-75 D D 6 12.4 11-06-75 D D 8 12.4 11-05-75 N D 0 13.2 11-05-75 N D 2 12.3 11-05-75 N D 4 12.2 11-05-75 N D 6 11.9 | 11-06-75 D D 6 12.4 11-06-75 D D 8 12.4 11-05-75 N D 0 13.2 11-05-75 N D 2 12.3 11-05-75 N D 4 12.2 11-05-75 N D 6 11.9 | 1-06-75 D D | • | | | | | | | | | | | | | 0 | 0 |
| 11-06-75 D D 8 12.4 11-05-75 N D 0 13.2 11-05-75 N D 2 12.3 11-05-75 N D 4 12.2 11-05-75 N D 6 11.9 | 11-06-75 D D 8 12.4 11-05-75 N D 0 13.2 11-05-75 N D 2 12.3 11-05-75 N D 4 12.2 11-05-75 N D 6 11.9 11-05-75 N D 8 11.9 | 11-06-75 D D | • | | | | | | | | | | | | | 0 | 0 |
| 1-05-75 N D O 13.2 1-05-75 N D 2 12.3 1-05-75 N D 4 12.2 1-05-75 N D 6 11.9 | 1-05-75 N D O 13.2 1-05-75 N D 2 12.3 1-05-75 N D 4 12.2 1-05-75 N D 6 11.9 | 11-06-75 D D | • | | | | | | | | | | | | | 0 | 0 |
| 1-05-75 N D 2 12.3 1-05-75 N D 4 12.2 1-05-75 N D 6 11.9 1-05-75 N D 8 11.9 | 1-05-75 N D 2 12.3 1-05-75 N D 4 12.2 1-05-75 N D 6 11.9 1-05-75 N D 8 11.9 | 1-05-75 N D | • | | | | | | | | | | | | | 0 | 0 |
| 1-05-75 N D 4 12.2 1-05-75 N D 6 11.9 1-05-75 N D 8 11.9 | 1-05-75 N D 4 12.2 1-05-75 N D 6 11.9 1-05-75 N D 8 11.9 | 1-05-75 N D | • | | | | | | | | | | | | | 0 | 0 |
| 1-05-75 N D 8 11.9 | 1-05-75 N D 8 11.9 | 1-05-75 N D | • | | | | | | | | | | | | | 0 (| 0 (|
| 0-05-75 N U 8 11.9 | 0 8 11.9 0 N 2/-20-1 | 1-05-75 N D | • | | | | | | | | | | | | | 0 (| 0 (|
| | | 1-05-75 N D | | | | | | | | | | | | | | 0 | 0 |

Appendix 8. Continued.

| Total Control Sample Pa | arameter | ters | | | | | S | Species/Groups | Group | ທ | | | | | | |
|--|-----------|----------|----------------|----|----|----------------|-----|---|----------------|-------|----|----|----|----|-------|-----------------|---------------|
| 06-75 D E 10 13.8 0-6-75 D E 12 11.0 0-6-75 D E 12 11.0 0-6-75 D E 12 11.0 0-6-75 D E 12 11.0 0-6-75 D E 12 11.0 0-6-75 D E 12 11.0 0-6-75 D E 12 11.2 0-6-75 D E 12 11.2 0-6-75 D E 12 12.2 0-6-75 D E 12 12.2 0-6-75 D E 12 12.2 0-6-75 D E 12 12.2 0-6-75 D E 12 12.2 0-6-75 D E 12 12.2 0-6-75 D E 12 12.2 0-6-75 D E 12 12.2 0-6-75 D E 12 12.3 0-6-75 D E 12 | ate D1 S | а Ор | - | AL | SP | w _S | 4 b | 4 | Oρ | CP | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| 06-75 N E 20 11.3 06-75 N E 20 11.3 06-75 N E 20 11.2 06-75 N E 20 11.2 06-75 N E 20 11.2 06-75 N G 2 12.2 06-75 N G 4 12.2 06-75 N G 6 12.2 06-75 N G 6 12.2 06-75 N G 6 12.2 06-75 N H O 12.3 | 1-06-75 n | | | | | | | | | | | | | | | | |
| 0.6-75 D E 14 11:0 0.6-75 N E 20 11:0 0.6-75 N E 14 11:0 0.6-75 N E 14 11:2 0.6-75 D G 0 11:2 0.6-75 D G 0 12:8 0.6-75 D G 0 12:8 0.6-75 D G 0 12:8 0.6-75 D H 0 12:2 0.6-75 D H 0 12:3 0.6-75 D | 1-06-75 D | | | | | | | | | | | | | | | O | O |
| 06-75 N E 20 11.0 06-75 N E 14 11.2 06-75 N E 14 11.2 06-75 N E 14 11.2 06-75 N E 14 11.2 06-75 N G 12.8 06-75 N G 0 12.8 06-75 N G 0 12.8 06-75 N G 0 12.4 06-75 N G 0 12.4 06-75 N G 0 12.4 06-75 N G 0 12.4 06-75 N H A 12.3 06-75 N H A 12.3 06-75 N H A 12.3 06-75 N H A 12.3 06-75 N H A 12.3 06-75 N H A 12.3 06-75 N H A 12.3 06-75 N H A 12.2 06-75 N H A 12.3 06-75 N H A 12.3 06-75 N H A 12.2 06-75 N H A 12.3 06-75 N H A 12.3 06-75 N H A 12.3 06-75 N H A 12.3 06-75 N H A 12.3 06-75 N H A 12.3 06-75 N H A 12.2 06-75 N H A 12.2 06-75 N H A 12.2 06-75 N H A 12.2 06-75 N H A 12.2 | 1-06-75 D | | ; - | | | | | | | | | | | | | o c |) C |
| 06-75 N E 14 11.2 06-75 N E 14 11.2 06-75 N E 14 11.2 06-75 N C 12.8 06-75 N C 2 12.8 06-75 N C 2 12.8 06-75 N C 2 12.1 06-75 N C 2 12.1 06-75 N C 2 12.1 06-75 N C 2 12.1 06-75 N C 3 12.2 06-75 N C 4 12.2 06-75 N C 4 12.2 06-75 N C 6 12.1 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.9 06-75 N C 7 12.8 06-75 N C 7 12.8 06-75 N C 7 12.8 06-75 N C 7 12.8 06-75 N C 7 12.8 06-75 N C 7 12.8 06-75 N C 7 12.8 | 1-06-75 D | | <u>_</u> . | | | | | | | | | | | | | 0 | 0 |
| 06-75 N E 18 11.2 06-75 N E 18 11.2 06-75 N E 19 11.2 06-75 D G 12.8 06-75 D G 2 12.8 06-75 D G 3 12.2 06-75 D G 4 12.2 06-75 D H 2 12.3 06-75 D H 4 12.3 06-75 D H 4 12.3 06-75 D H 6 12.3 06-75 D H 7 12.3 06-75 D H 8 12.2 06-75 D H 8 12.2 06-75 D H 8 12.2 06-75 D H 8 12.2 06-75 D H 8 12.2 06-75 D H 8 12.2 06-75 D H 8 12.2 06-75 D N H 6 12.3 06-75 D N H 7 12.8 06-75 D N H 8 12.2 06-75 D N H 8 12.2 06-75 D N H 8 12.2 06-75 D N H 8 12.2 06-75 D N H 8 12.2 | 1-05-75 N | | Ť. | | | | | | | | | | | | | 0 | 0 |
| 06-75 N E 14 11.2 06-75 N E 20 11.2 06-75 D G 2 12.8 06-75 D G 4 12.2 06-75 D N G 6 12.4 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D N H 0 12.9 | 1-06-75 N | | | | | | | | | | | | | | | 0 | 0 |
| -06-75 N G 0 12 8 -06-75 N G 0 12 8 -06-75 N G 0 12 8 -06-75 N G 0 12 8 -06-75 N G 0 12 2 -06-75 N G 0 12 2 -06-75 N G 0 12 2 -06-75 N G 0 12 2 -06-75 N H D 12 2 -06-75 N H D 12 3 -06-75 N H G 12 2 -06-75 N H G 12 8 -06-75 N H G 12 8 -06-75 N H G 12 8 -06-75 N H G 12 8 -06-75 N H G 12 8 -06-75 N H G 12 8 -06-75 N H G 12 8 | 1-06-75 N | | <u>.</u> . | | | | | | | | | | | | | 0 | 0 |
| 0.6-75 D G 0 12.8 0.6-75 D G 0 12.8 0.6-75 D G 0 12.2 0.6-75 N G 0 12.2 0.6-75 N G 0 12.2 0.6-75 N G 0 12.2 0.6-75 N G 0 12.2 0.6-75 N G 0 12.3 0.6-75 D H 0 12.3 | N 6/-90-1 | | | | | | | | | | | | | | | 0 | 0 |
| 06-75 D G 2 12.8 06-75 D G 6 4 12.2 06-75 D G 6 4 12.2 06-75 N G 0 13.4 06-75 N G 0 13.4 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D H 0 12.9 06-75 D R 0 13.0 06-75 D R 0 13.0 06-75 D R 0 13.0 06-75 D R 0 13.0 | 1-06-75 D | | | | | | | | | | | | | | | c | 0 |
| 06-75 D G 4 12.2 09-75 N G 2 12.1 09-75 N G 2 12.1 09-75 N G 6 12.2 09-75 N G 6 12.2 09-75 N G 6 12.2 09-75 N G 6 12.2 09-75 N G 6 12.4 09-75 N H C 12.9 09-75 N H C 12.9 09-75 N H C 12.9 09-75 N H C 12.9 09-75 N H C 12.9 09-75 N H C 12.9 09-75 N H C 12.9 09-75 N H C 12.2 09-75 N H C 12.2 09-75 N H C 12.2 09-75 N H C 12.9 09-75 N H C 12.2 09-75 N H C 12.2 09-75 N H C 12.2 09-75 N H C 12.2 09-75 N H C 12.2 09-75 N H C 12.2 09-75 N H C 12.2 09-75 N H C 12.2 09-75 N H C 12.2 09-75 N R C 12.8 09-75 N R C 12.8 09-75 N R C 12.8 09-75 N R C 12.8 09-75 N R C 12.8 | 1-06-75 D | | • | | | | | | | | | | | | | 0 | 0 |
| 0.6-75 N G 6 12.2 0.9-75 N G 0 13.4 0.9-75 N G 2 12.1 0.9-75 N G 4 12.2 0.9-75 N G 4 12.2 0.9-75 N G 4 12.2 0.9-75 N G 4 12.2 0.9-75 N H D 12.9 0.9-75 N H D 12.9 0.9-75 N H D 12.3 0.9-75 N R D 12.3 0.9-75 N R D 12.3 0.9-75 N R D 12.3 | 1-06-75 D | | | | | | | | | | | | | | | 0 | 0 |
| 05-75 N G 0 13.4 05-75 N G 12.1 06-75 N G 2 12.1 06-75 N G 12.4 06-75 N G 12.4 06-75 N H 2 12.3 06-75 N H 2 12.3 06-75 N H 2 12.3 06-75 N H 2 12.3 06-75 N H 2 12.3 06-75 N H 2 12.3 06-75 N H 2 12.3 06-75 N H 2 12.3 06-75 N H 2 12.3 06-75 N H 2 12.2 06-75 N H 2 12.2 06-75 N H 2 12.2 06-75 N H 2 12.2 06-75 N H 2 12.2 06-75 N H 2 12.2 06-75 N H 2 12.2 06-75 N H 2 12.2 06-75 N H 2 12.2 06-75 N H 2 12.2 06-75 N H 2 12.8 06-75 N R 2 12.8 06-75 N R 2 12.8 06-75 N R 2 12.8 06-75 N R 2 12.8 06-75 N R 2 12.8 | 1-06-75 D | | | | | | | | | | | | | | | 0 | 0 |
| 05-75 N G 2 12.1 -05-75 N G 4 12.2 -06-75 N G 6 4 12.2 -06-75 D H O 12.9 -06-75 D H A 12.3 -06-75 D H A 12.3 -06-75 D H A 12.3 -06-75 D H B 12.3 -06-75 N H G 12.3 -06-75 N H A 12.3 -06-75 N H A 12.3 -06-75 N H B 12.2 | 1-05-75 N | | | | | | | | | | | | | | | 0 | 0 |
| 0.5-75 N G 4 12.2 0.6-75 N G 6 12.4 0.6-75 D H 0 12.9 0.6-75 D H 2 12.9 0.6-75 D H 8 12.3 0.6-75 D H 8 12.3 0.6-75 N H 2 12.9 0.6-75 N H 2 12.9 0.6-75 N H 2 12.9 0.6-75 N H 4 12.2 0.6-75 N H 4 12.2 0.6-75 N H 6 12.2 0.6-75 N H 7 12.2 0.6-75 N H 8 12.3 0.6-75 N H 8 12.2 0.6-75 N H 8 12.2 0.6-75 N H 8 12.2 0.6-75 N H 8 12.2 0.6-75 N R 2 12.8 0.6-75 N R 2 12.8 0.6-75 N R 6 12.8 0.6-75 N R 6 12.8 0.6-75 N R 6 12.9 0.6-75 N R 6 12.9 0.6-75 N R 6 12.9 | 1-05-75 N | | • | | | | | | | | | | | | | 0 | 0 |
| 05-75 N G G 12.4 -06-75 D H 0 12.9 -06-75 D H 6 12.3 -06-75 D H 6 12.3 -06-75 D H 8 12.3 -06-75 D H 8 12.3 -06-75 D H 8 12.3 -06-75 D H 8 12.3 -06-75 D H 8 12.3 -06-75 D H 8 12.3 -06-75 D H 8 12.3 -06-75 D H 8 12.2 -06-75 D N H 12.2 -06-75 D R 2 13.0 -06-75 D R 2 12.8 -06-75 D R 4 12.8 -06-75 D R 7 12.8 -06-75 N R 2 12.8 -06-75 N R 2 12.8 -06-75 N R 2 12.8 -06-75 N R 4 12.2 -06-75 N R 6 12.8 -06-75 N R 6 12.8 -06-75 N R 7 12.2 | 1-05-75 N | | | | | | | | | | | | | | | 0 | 0 |
| 06-75 D H O 12.9 -06-75 D H 2 12.9 -06-75 D H 4 12.3 -06-75 D H 6 12.3 -06-75 D H 6 12.3 -06-75 D H 6 12.3 -06-75 D H 6 12.3 -05-75 N H 2 12.2 -05-75 N H 4 12.2 -05-75 N H 8 12.2 -05-75 N H 8 12.2 -05-75 N H 8 12.2 -06-75 D R O 13.0 -06-75 D R A 12.8 -06-75 D R A 12.8 -06-75 D R A 12.8 -06-75 D R B 12.2 -06-75 D R C 12.8 -06-75 D R C 12.8 -06-75 D R C 12.8 -06-75 D R C 12.8 -06-75 N R C 12.8 -06-75 N R C 12.8 -06-75 N R C 12.8 -06-75 N R C 12.8 -06-75 N R C 12.8 -06-75 N R C 12.8 | 1-05-75 N | | • | | | | | | | | | | | | | 0 | 0 |
| 06-75 D H O 12.9 -06-75 D H O 12.9 -06-75 D H 6 12.3 -06-75 D H 6 12.3 -06-75 D H 8 12.3 -06-75 D H 8 12.3 -05-75 N H 2 12.2 -05-75 N H 6 12.2 -05-75 N H 6 12.2 -06-75 D R O 13.0 -06-75 D R O 13.0 -06-75 D R O 12.8 -06-75 D R O 12.9 -06-75 D R O 12.9 -06-75 N R O 12.9 -06-75 N R O 12.9 -06-75 N R O 12.9 -06-75 N R O 12.9 -06-75 N R O 12.9 -06-75 N R O 12.9 -06-75 N R O 12.9 -06-75 N R O 12.9 | ! | | | | | | | | | | | | | | | | |
| -06-75 D H 2 12.9 -06-75 D H 6 12.3 -06-75 D H 6 12.3 -06-75 D H 6 12.3 -06-75 D H 8 12.3 -06-75 N H 0 12.9 -05-75 N H 6 12.2 -05-75 N H 6 12.2 -06-75 D R 0 13.0 -06-75 D R 0 13.0 -06-75 D R 0 12.8 -06-75 N R 2 12.8 -06-75 N R 2 12.8 -06-75 N R 2 12.8 -06-75 N R 6 12.8 -06-75 N R 6 12.1 | 1-06-75 D | | | | | | | | | | | | | | | 0 | 0 |
| -06-75 D H 6 12.3 -06-75 D H 8 12.3 -05-75 N H 0 12.9 -05-75 N H 2 12.3 -05-75 N H 4 12.2 -05-75 N H 8 12.2 -05-75 D R 0 13.0 -06-75 D R 0 13.0 -06-75 D R 6 12.8 -06-75 D R 6 12.8 | 1-06-75 0 | | ٠ | | | | | | | | | | | | | 0 | 0 |
| -06-75 N H 2 12.3 -05-75 N H 2 12.3 -05-75 N H 2 12.3 -05-75 N H 4 12.2 -05-75 N H 6 12.2 -05-75 N H 6 12.2 -06-75 D R 0 13.0 -06-75 D R 0 13.0 -06-75 D R 0 12.8 -06-75 N R 0 12.9 -05-75 N R 0 12.9 -05-75 N R 0 12.9 -05-75 N R 0 12.9 | 1-06-75 0 | | | | | | | | | | | | | | | 0 | 0 |
| -05-75 N H 0 12.3 -05-75 N H 0 12.3 -05-75 N H 4 12.2 -05-75 N H 6 12.2 -05-75 N H 6 12.2 -06-75 D R 0 13.0 -06-75 D R 0 13.0 -06-75 D R 0 12.8 -06-75 D R 0 12.9 -06-75 D R 6 12.8 -06-75 D R 6 12.8 -06-75 N R 0 12.9 -05-75 N R 0 12.9 -05-75 N R 6 12.1 | 1-06-75 D | | ٠ | | | | | | | | | | | | | 0 | 0 |
| -05-75 N H 2 12.3 -05-75 N H 4 12.3 -05-75 N H 6 12.2 -05-75 N H 6 12.2 -05-75 N H 8 12.2 -06-75 D R 0 13.0 -06-75 D R 2 13.0 -06-75 D R 4 12.8 -06-75 D R 6 12.8 -06-75 D R 8 12.2 -06-75 D R 6 12.8 -06-75 D R 6 12.8 -06-75 D R 6 12.8 -06-75 N R 6 12.9 -05-75 N R 6 12.1 | 1-06-75 0 | | • | | | | | | | | | | | | | o (| 0 (|
| -05-75 N H 4 12.2 -05-75 N H 6 12.2 -05-75 N H 8 12.2 -06-75 D R 0 13.0 -06-75 D R 2 13.0 -06-75 D R 4 12.8 -06-75 D R 6 12.8 -06-75 D R 6 12.8 -05-75 N R 0 12.9 -05-75 N R 6 12.1 | N 01-10-1 | | | | | | | | | | | | | | | 5 (| O (|
| -05-75 N H 6 12.2 -05-75 N H 8 12.2 -06-75 D R 0 13.0 -06-75 D R 2 13.0 -06-75 D R 4 12.8 -06-75 D R 6 12.8 -06-75 N R 0 12.9 -05-75 N R 12.8 -05-75 N R 2 12.8 -05-75 N R 6 12.1 | 4-05-75 N | | | | | | | | | | | | | | | o (| > (|
| -05-75 N H 8 12.2 -06-75 D R 0 13.0 -06-75 D R 2 13.0 -06-75 D R 4 12.8 -06-75 D R 6 12.8 -05-75 N R 0 12.9 -05-75 N R 12.1 -05-75 N R 6 12.1 | 1-03-75 N | | | | | | | | | | | | | | | 0 (| 0 0 |
| -06-75 D R 0 13.0 -06-75 D R 2 13.0 -06-75 D R 4 12.8 -06-75 D R 6 12.8 -06-75 D R 6 12.8 -05-75 N R 0 12.9 -05-75 N R 4 12.2 -05-75 N R 6 12.1 | 1-05-75 N | | | | | | | | | | | | | | | o c | c |
| -06-75 D R 0 13.0 -06-75 D R 2 13.0 -06-75 D R 2 13.0 -06-75 D R 4 12.8 -06-75 D R 6 12.8 -05-75 N R 0 12.9 -05-75 N R 4 12.2 -05-75 N R 6 12.1 | | | | | | | | | | | | | | | |) | , |
| -06-75 D R 2 13.0 -06-75 D R 4 12.8 -06-75 D R 6 12.8 -05-75 N R 0 12.9 -05-75 N R 4 12.2 -05-75 N R 6 12.1 | 1-06-75 D | | е | | | | | | | | | | | | | 0 | 0 |
| -06-75 D R 4 12.8 -06-75 D R 6 12.8 -05-75 N R 0 12.9 -05-75 N R 2 12.8 -05-75 N R 4 12.2 -05-75 N R 6 12.1 | 1-06-75 D | | • | | | | | | | | | | | | | 0 | 0 |
| -06-75 D R 6 12.8 -05-75 N R 0 12.9 -05-75 N R 2 12.8 -05-75 N R 4 12.2 | 1-06-75 D | | | | | | | | | | | | | | | 0 | 0 |
| -05-75 N R 0 12.9 -05-75 N R 2 12.8 -05-75 N R 4 12.2 -05-75 N R 6 12.1 | 1-06-75 D | | • | | | | | | | | | | | | | 0 | 0 |
| -05-75 N R 2 12.8 0 -05-75 N R 4 12.2 0 -05-75 N R 6 12.1 0 | -05-75 N | | | | | | | | | | | | | | | 0 | 0 |
| -05-75 N R 4 12.2 0 -05-75 N R 6 12.1 0 | -05-75 N | | • | | | | | | | | | | | | | 0 | 0 |
| 1-05-75 N R 6 12.1 | -05-75 N | | | | | | | | | | | | | | | 0 | 0 |
| | 1-05-75 N | | | | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | | | | |

Appendix 8. Continued.

| | Eggs | 0000 |
|-------------------|-----------------------------------|--|
| | | |
| | Total BR SS NS FS Misc. Larvae | 0000 |
| | Misc. | |
| | FS | |
| | SN | |
| | 5.5 | |
| v | BR | |
| Group | CP | |
| Species/Groups | ۵۲ | |
| S | 16 | |
| | γP | |
| | ₩ S | |
| | SP | |
| | AL | |
| s. | c C | 12.1 11.5 11.5 |
| Sample Parameters | Temp Di Sta Dpt C | 0 8 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 |
| Darai | Stal | 3333 |
|]e | 10 | 000 |
| Samp | Date | 11-06-75 11-06-75 11-06-75 11-06-75 |

Appendix 9. Densities (no./1,000 m³) for fish eggs and larvae collected at beach (A, B, F) and open water (C, D, G, H, E, W, R, N, 4, 5, 6) stations in Cook Plant study areas, southeastern Lake Michigan, 1976.

| Sample | Parameters | ters | | | and the state of t | | S | Species/Groups | /Group | SC | | | | | | |
|--|------------|--|----|----|--|----|----|----------------|--------|----|----|-------|----|-------|-----------------|------------|
| Date D1 | Sta Dpt | Temp | AL | SP | NS. | dλ | 47 | ۵n | СР | BR | SS | NS NS | FS | Misc. | Total Larvae | Eggs |
| 2-26-76 D 2-26-76 D | 0 0 4 4 | 7.5 | | | | | | | | | | | | | 00 | 00 |
| | | | | | | | | | | | | | | | 00 | o o |
| 2-26-76 D 2-26-76 D 2-26-76 N 2-26-76 N | 0000 | 5 5 5 6 6 7 7 8 7 8 8 9 8 9 9 9 9 9 8 9 9 8 9 7 8 9 7 8 7 8 | | | | | | | | | | | | | 0000 | 0000 |
| 4-12-76 D 4-12-76 D 4-13-76 N 4-13-76 N | 0000 | 10.1 10.1 7.9 7.9 | | | | | | | - | | | | | | 0000 | 0000 |
| 4-12-76 D 4-12-76 D 4-13-76 N 4-13-76 N | 8888 | 9.5 9.5 7.0 | | | | | | | | | | | | | 0000 | 0000 |
| 4-12-76 D 4-12-76 D 4-13-76 N 4-13-76 N | 0000 | 10.3 10.3 7.9 7.9 | | | | | | | | | | | | | 0000 | 0000 |
| 5-10-76 D 5-10-76 D 5-10-76 N 5-10-76 N | 0000 | 17.5 17.5 15.5 15.5 | | | | | | | | | | | | | 0000 | 0000 |
| 5-10-76 D 5-10-76 D 5-10-76 N 5-10-76 N | 8888 | 15.5 15.0 15.0 | | | | | | | | | | | | | 0000 | 0000 |

Appendix 9. Continued.

| Sample | 1 | Parameter | ers | | | | | ЗS | Species/Groups | /Group | v | | | | | | |
|----------|--------|-----------|--------------|-------|-------|-----|----|-----|----------------|--------|----|----|---|----|-------|-----------------|------------|
| Date D1 | ı Sta | a Opt | Temp | AL | SP | WS | ΥP | 1.0 | g _P | d O | BR | SS | S | FS | Misc. | Total Larvae | Eggs |
| | | (| 1 | | | | | | | | | | | | | | |
| - 10- /6 | | O | | | | | | | | | | | | | |) | O (|
| - 10-76 | | 0 | • | | | | | | | | | | | | | 0 | 0 |
| 5-10-76 | u Z | 0 | 15.5 | | | | | | | | | | | | | 0 | 0 |
| - 10-76 | | 0 | | | | | | | | | | | | | | 0 | 185 |
| -14-76 | | 0 | 4 | 7494 | | | | | | | | | | | | 7494 | 0 |
| -14-76 | | 0 | 24.5 | 15590 | | | | | | | | | | | | 15590 | 0 |
| -14-76 | | 0 | _ | 16874 | 14343 | | | | _ | 11814 | | | | | | 43031 | 29535 |
| 14-76 | ۷ ۷ | 0 | - | 3667 | 5808 | | | 305 | | 4281 | | | | | | 14061 | 39143 |
| -14-76 | | C | 24.0 | 8660 | | | | | | | | | | | | 8660 | С |
| -14-76 | | 0 | 24.0 | 8504 | | 125 | | | | | | | | | | 8629 | 0 |
| 6-14-76 | 8 2 | 0 | 21.5 | 765 | 573 | | | | | | | | | | | 1338 | 4406 |
| -14-76 | | 0 | 21.5 | 1200 | 1800 | | | | | | | | | | | 3000 | 6846 |
| -14-76 | | 0 | 6 | 888 | | | | | | | | | | | | 888 | 0 |
| -14-76 | | 0 | е С | 7716 | | | | | | | | | | | | 7716 | 701 |
| 4-76 | u Z | 0 | 21.3 | 1856 | 2321 | | | | | | | | | | | 4177 | 0 |
| -14-76 | | 0 | | 2525 | 505 | | | | | | | | | | | 3030 | 0 |
| -13-76 | | 0 | | 408 | 205 | | | | | | | | | | | 613 | 308 |
| 3-76 | D A | 0 | 20.3 | 404 | 101 | | | | | | | | | | | 505 | 303 |
| -13-76 | | 0 | | 832 | 624 | | | | | | | | | | | 1456 | 2708 |
| -13-76 | | 0 | | 870 | 435 | | | | | | | | | | | 1305 | 2614 |
| -13-76 | | 0 | | 351 | | | | | | | | | | | | 351 | 234 |
| 9-16 | 0 8 | 0 | 20.5 | | | | | | | | | | | | | 0 | 0 |
| -13-76 | | 0 | | 871 | 230 | | | | | | | | | | | 1161 | 0 |
| -13-76 | | 0 | | 1113 | 478 | | | | | 159 | | | | | | 1750 | 0 |
| -13-76 | | 0 | | 2768 | 138 | | | | | | | | | | | 2906 | 138 |
| -13-76 | | 0 | | 2664 | | | | | | | | | | | | 2664 | 148 |
| 7-13-76 | u Z | 0 | 21.0 | 888 | 444 | | | | | | | | | | | 1332 | 0 |
| - 13-76 | | 0 | • | 750 | 428 | | | | | | | | | | | 1178 | 0 |
| | | | | | | | | | | | | | | | | | |

Appendix 9. Continued.

| 10 1 1 1 1 1 1 1 1 1 | Sample | 1 | Parameter | ters | | | | | ¥\$ | Species/Groups | 'Group | S | | | | | | |
|---|--------------------------|------|-----------|----------------------|--------------------------|-----|----------|----|-----|----------------|--------|----|-----|----|----|-------|--------------------------|--------------------|
| 9-76 D A 0 24.5 642 9-76 D A 0 24.5 642 9-76 D A 0 24.5 642 9-76 D B 0 24.3 942 9-76 D B 0 24.3 957 9-76 D B 0 24.3 957 9-76 D B 0 22.0 957 9-76 D F 0 22.0 959 9-76 D A 0 22.0 959 | Date D | 1 St | а Ор | | AL | SP | NS NS | γP | 1.0 | 9 | СР | BR | 5.5 | NS | FS | Misc. | Total Larvae | Eggs |
| 9-76 N B 0 24.3 9-76 N B 0 24.3 9-76 N B 0 22.0 | | | | 24 24 23 23 | 642 240 642 240 | 107 | | | 107 | | | | | | | | 642 240 856 240 | 0 0 322 0 |
| 9-76 N F 0 24.0 7-76 N F 0 22.0 7-76 N F 0 22.0 7-76 N A 0 22.0 7-76 N A 0 22.0 7-76 N A 0 22.0 7-76 N A 0 22.0 7-76 N A 0 22.0 7-76 N A 0 22.0 7-76 N A 0 22.0 7-76 N A 0 22.0 7-76 N B 0 19.9 7-76 N B 0 19.9 7-76 N B 0 19.9 7-76 N B 0 19.9 7-76 N B 0 19.9 7-76 N B 0 19.9 7-76 N B 0 19.9 7-76 N B 0 19.9 7-76 N B 0 19.9 7-76 N B 0 16.3 7-76 N B 0 16.3 7-76 N A 0 18.9 | | | | 22 44 22 22 | 357 119 | 357 | | | | | | | | | | | 0 714 119 | 238 0 0 |
| 3-76 D A 0 22.0 3-76 D A 0 22.0 4-76 N A 0 20.0 4-76 N A 0 20.0 4-76 N B 0 20.0 3-76 D B 0 20.0 3-76 D F 0 21.7 4-76 N F 0 19.5 4-76 N F 0 19.5 4-76 N F 0 19.5 4-76 N F 0 19.5 4-76 N F 0 19.5 4-76 N F 0 19.5 4-76 N F 0 19.5 4-76 N F 0 19.5 4-76 N A 0 16.3 4-76 N A 0 13.9 | | | | 22 44 22 22 | | | | | | | | | | | | | 0000 | 0000 |
| 3-76 D B 0 22.0 303 3-76 D B 0 22.0 303 4-76 N B 0 19.9 4-76 N B 0 19.9 4-76 N B 0 19.9 4-76 D F 0 21.7 121 4-76 N F 0 19.5 4-76 N F 0 19.5 4-76 N F 0 16.3 4-76 D A 0 16.3 4-76 N A 0 13.9 | -76 -76 -76 -76 | | | 22 22 20 20 | | | | | 6) | | | | | | | | 0006 | 0000 |
| 3-76 D F 0 21.7 121 121 121 121 121 121 121 121 121 12 | -76 -76 -76 -76 | | | 22. 22. 19. | 303 | | | | | | | | | | | | 303 | 0000 |
| 1-76 D A O 16.3 1-76 D A O 16.3 2-76 N A O 13.9 2-76 N A O 13.9 | -76 -76 -76 -76 | | | 21. 21. 19. | 121 | | | | | | | | | | | | 121 | 0000 |
| | -76 -76 -76 -76 | | | | | | | | | | | | | | | | 0000 | 0000 |

Appendix 9. Continued.

| | Eggs | 0000 | 0000 | 0000 | 0000 | 0000 | 0000000 | 000000000 |
|----------------|-----------------|--------------------------|----------------------|---|--------------------------|---|---|---|
| | _ | | | | | | | |
| | Total Larvae | 0000 | 0000 | 0000 | 0000 | 0000 | 0000000 | 00000000 |
| | Misc. | | | | | | | |
| | FS | | | | | | | |
| | NS | | | | | | | |
| | 88 | | | | | | | |
| 10 | BR | | | | | | | |
| aroups | СР | | | | | | | |
| Species/Groups | 00 | | | | | | | |
| Spec | | | | | | | | |
| | 10 | | | | | | | |
| | Α. | | | | | | | |
| | SM | | | | | | | |
| | SP | | | | | | | |
| | | | | | | | | |
| | AL | | | | | | | |
| ς. | Temp C | 15.5 13.5 13.5 | 15.0 15.0 14.0 | 6 6 6 6 6 6 7 | 6.5 6.5 6.0 6.0 | ស ស ស ស ស ស ស ស ស ស ស ស ស ស ស ស ស ស ស | 9 9 8 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9 8 8 8 8 8 8 8 9 | 25 4 2 4 2 4 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 |
| Parameters | Dpt | 0000 | 0000 | 0000 | 0000 | 0000 | 0 0 4 0 0 0 4 0 | 0 7 4 9 8 0 7 4 9 8 |
| ara | Sta | 8888 | <u> </u> | 4444 | 8 8 8 8 | | 00000000 | 000000000 |
| | 01.8 | 0022 | 00ZZ | 0 0 Z Z | 0 0 Z Z | 0022 | 00002222 | 0 0 0 0 0 Z Z Z Z Z |
| ашрје | | -76 -76 -76 -76 | -76 -76 -76 | 76 76 76 76 | -76 -76 -76 | -76 -76 -76 | 76 76 76 76 76 76 | -76 -76 -76 -76 -76 -76 -76 |
| Şi | Date | 1122 | ==== | -08-76 -08-76 -08-76 | 8888 | -08 -08 -08 | 444444 | 444444444 |
| i | 1 0 | 0000 | 0000 | ======================================= | 1 1 1 1 | 1 1 1 1 | 44444444 | 444444444 |

Appendix 9. Continued.

| | Eggs | 0000000 | 0000000 | 000000000 | 0000000 |
|----------------|-----------------|---|---|---|---|
| | Total Larvae | 000 \$ 0000 | 0000000 | 000000000 | 0000000 |
| | Misc. | | | | |
| | FS | | | | |
| | NS | | | | |
| | SS | | | | |
| SC | BR | 9 | | | |
| /Group | CP | | | | |
| Species/Groups | 9 | | | | |
| S | ТР | | | | |
| | γP | | | | |
| | SM | | | | |
| | SP | | | | |
| | AL | | | | |
| | Temp | 5.77.00 | 99.7 99.5 99.5 7.8 8.1 | 0.0000000000000000000000000000000000000 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| Parameter | Dpt | 0 8 4 7 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 00400040 | 0040000400 | 00400040 |
| Para | Sta | | | IIIIIIIII | ~~~~~~~ |
| 1 | 10 | 00002222 | 00002222 | 0000022222 | 00002222 |
| Sample | Date | 4-14-76 4-14-76 4-14-76 4-14-76 4-14-76 4-14-76 4-14-76 | 4 - 14 - 76 4 - 14 - 76 4 - 14 - 76 4 - 13 - 76 4 - 13 - 76 4 - 13 - 76 4 - 13 - 76 | 4 - 14 - 76 4 - 14 - 76 4 - 14 - 76 4 - 14 - 76 4 - 13 - 76 4 - 13 - 76 4 - 13 - 76 4 - 13 - 76 4 - 13 - 76 | 4 - 14 - 76 4 - 14 - 76 4 - 14 - 76 4 - 14 - 76 4 - 14 - 76 4 - 14 - 76 4 - 14 - 76 |

Appendix 9. Continued.

| Sample P | Parameter | eters | | | | - | S | Species/Groups | Group | s | | | | | | |
|-----------|-----------|----------|----|----|-----|---|------------|----------------|-------|----|----|----|----|-------|-----------------|------|
| Date D1 S | Sta Dp | Temp | AL | SP | WS. | 4 | d L | Q. | CP | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| 14-76 | | a | | | | | | | | | | | | | c | |
| 1 4 |) Q | . o | | | | | | | | | | | | | 0 | 0 |
| -14-76 | | מו | | | | | | | | | | | | | 0 | 0 |
| -14-76 | | | | | | | | | | | | | | | 0 | 0 |
| -13-76 | | 7 | | | | | | | | | | | | | 0 | 0 |
| -13-76 | | 9 | | | | | | | | | | | | | 0 | 0 |
| -13-76 | | IJ. | | | | | | | | | | | | | 0 | 0 |
| -13-76 | | S. | | | | | | | | | | | | | 0 | 0 |
| 1 | | • | | | | | | | | | | | | | c | C |
| -12-76 | | 2 5 | | | | | | | | | | | | | o c | o c |
| 5-12-76 | ، د | 4. 6. | | | | | | | | | | | | | c | o C |
| 9/-71- | | 2 : | | | | | | | | | | | | | o c | 0 0 |
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| 5-13-76 N | ш | 0 10.2 | | | 25 | | | | | | | | | | 25 | 0 |
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Appendix 9. Continued.

| | Eggs | 000000 | 0 000000000 | 0000000 | 0000000 |
|----------------|-----------------|--|--|--|---|
| | Total Larvae | 000000 | 0 0000 30000 | 0000 m 000 | 00000 |
| | Misc. | | | | |
| | FS | | | | |
| | N S | | | | |
| | SS | | | | |
| Ø | BR | | | | |
| Group | СР | | | | |
| Species/Groups | ۵۲ | | | | |
| S | 4. | | | | |
| | d > | | | | |
| | SM | | 31 | 35 | 27 |
| | SP | | | | |
| | AL | | | | |
| ខ | Temp | 13.0 10.5 11.0 11.5 11.5 | | 6.4 | 0.11 0.11 0.11 0.11 0.11 |
| Parameter | Dpt | 044004 | 10 OW4080V408 | 00400040 | 08 4 4 4 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| Parë | Sta | 000000 | o riiiiiiii | ******** | 3333333 |
| | 10 | 0000222 | ZZ GGGGGZZZZZ | | 0 0 0 0 Z Z Z Z |
| Sample | Date | 5-12-76 5-12-76 5-12-76 5-12-76 5-13-76 5-13-76 | - 13-7 - 13-7 - 12-7 - 12-7 - 12-7 - 13-7 - 13-7 - 13-7 | 7 - 21 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - | 5-12-76 5-12-76 5-12-76 5-12-76 5-13-76 5-13-76 5-13-76 |

Appendix 9. Continued.

| | | d S | | ∑ | <u>a</u> | 45 | 9 | ć | | | | | | Total | |
|--|--------------|--|----|----------|----------|----|---|---|----|----|---------|----|---------|--------|------|
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| 4 | c | 8 4 2 0 | | | | | | | | | | | | 3061 | 0 |
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| σ. | | , | | | | | | | | | | | | 3140 | 0 |
| 0 | 0 | 2 | | | | | | | | | | | | 232 | 0 |
| 7 | 2 | 8 | | | | | | | | | | | | 108 | 0 |
| 4 | 7 | 0 | | | | | | | | | | | | 210 | 1326 |
| 9 | 6 | | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | | |
| 0 | 0. | 11 | 22 | | | | | | | | | | | 133 | 0 |
| æ | 0. | 9 | | | | | | | | | | | | 26 | 0 |
| 4 | 0. | 6 | | | | | | | | | | | | 29 | 0 |
| 50 | 0. | 2 | | | | | | | | | | | | 32 | 0 |
| 0 | 5 | 2 | | | 26 | | | | | | | | | 78 | 0 |
| œ | α | ī, | | | | | | | | | | | | 25 | 0 |
| 14 | . c c | | | | | | | | | | | | | C | C |
| E 20 14 | 4 | 48 | | | | | | | | | | | | 48 | 0 |
| c | 5 | 50 | | | | | | | | | | | | 650 | 0 |
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| 4 | 7. | 54 | 26 | | | | | | | | | | | 80 | 1391 |
| 9 | .2 | 12 | | | | | | | | | | | | 192 | 289 |

Appendix 9. Continued.

| Date Dista Dit Case Dista Dit Case | Sample Para | Parameter | er s | | | | | Š. | Species/Groups | /Group | s | | | | | | |
|---|----------------------|------------|------|------|----|----|----|----|----------------|--------|----|----|----|----|-------|-----------------|------|
| 21-76 D 4 7.5 28 0< | ate D1 St | Dpt | Temp | AL | SP | SM | γP | 1P | ΩΓ | CP | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| 11-17-18-18-18-18-18-18-18-18-18-18-18-18-18- | -21-76 D | 0 | | 28 | | | | | | | | | | | | 28 | 0 |
| 21.76 D H 4 17.5 G< | -21-76 D | 7 | | | | | | | | | | | | | | 0 | 0 |
| 21-76 D H 6 10.5 66 21-76 N H 6 10.5 66 21-76 N H 6 10.5 66 21-76 N H 6 10.5 96 21-76 N H 6 10.5 96 21-76 N H 6 10.5 96 21-76 N H 6 10.5 96 21-76 N H 6 10.5 96 21-76 N H 6 10.5 96 21-76 N H 6 10.5 96 21-76 N H 6 10.5 96 21-76 D N H 6 10.5 96 21-76 D N H 7 10.0 38 | -21-76 D | 4 | | | | | | | | | | | | | | 0 | 0 |
| 22.7-6 N H 0 126 93 9 | -21-76 D | 9 | | 99 | | | | | | | | | | | | 99 | 0 |
| 227-76 N H 2 18.1 56 30 28 30 66 66 67 27-77 N H 2 18.1 30 28 30 66 67 28-77 N H 4 2 18.1 30 28 30 66 67 28-77 N H 4 2 18.1 30 28 30 66 67 28-77 N H 5 18.1 30 28 30 67 28-77 N H 6 18.2 20.3 28-77 N M 6 18.2 20.3 28-77 N M 7 10.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1 | -21-76 D | 80 | • | 32 | | | | | | | | | | | | 32 | 0 |
| 126 | -21-76 N | 0 | | 26 | | | | | | | | | | | | 56 | 0 |
| 227-76 N H 6 18.1 30 28 30 60 28 203 227-76 N H 6 18.1 30 28 30 60 28 30 60 28 30 28 30 60 28 30 28 30 60 28 30 28 30 28 30 22 3-76 N H 6 18.0 38 30 30 30 30 30 30 30 30 30 30 30 30 30 | -21-76 N | 7 | • | 126 | | | | | | | | | | | | 126 | 25 |
| 227-76 N H 6 10.0 28 28 22.77 N H 7 10.0 28 28 28 22.77 N H 8 10.0 28 28 22.77 N H 8 10.0 28 22.77 N H 8 10.0 28 22.77 N H 8 10.0 28 22.77 N H 8 10.0 28 22.77 N H 8 10.0 28 22.77 N H 8 10.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 | -21-76 N | 4 (| | 30 | | | | | 30 | | | | | | | 09 | 0 |
| 22.76 D R 0 18.5 203 22.76 D R 0 18.5 203 22.76 D W 0 7.5 648 21.76 D W W 1 18.2 17.0 38 22.176 D W W 20 17.5 648 22.176 D W W 1 18.2 17.0 136 22.176 D W W 1 18.2 17.0 136 22.176 D W W 1 18.2 17.0 136 22.176 D W W 1 18.2 17.0 136 22.176 D W W 1 18.5 17.0 136 22.176 D W W 20 13.4 24 15.76 D C 0 24.7 150 15.76 D C 0 24.7 150 15.76 D C 0 24.7 150 15.76 D C 0 24.7 150 15.76 D C 0 24.8 23.8 23.8 23.8 23.8 23.8 23.8 23.8 23 | -21-76 N -21-76 N | <u>ာ</u> ထ | | | | | 28 | | | | | | | | | 78 7 | 29 |
| 203 203 222-76 D R 2 203 203 222-76 D R 4 17.0 38 136 222-76 D M B 17.5 648 136 21-76 D M B 1.2 178 143 21-76 D M B 1.2 143 142 21-76 D M B 1.2 1.2 148 21-76 D M B 1.2 1.2 1.2 21-76 D M B 1.2 1.2 1.2 21-76 D M B 1.2 1.2 1.2 21-76 D M B 1.4 2.2 1.2 21-76 D M B 1.2 1.2 1.2 21-76 D M B 1.2 1.2 1.2 21-76 D | |) | | | | | | | | | | | | | |) | |
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| 222-76 D R 4 17.0 38 136 136 136 136 136 136 136 136 136 136 | -22-76 D | 7 | 7 | | | | | | | | | | | | | 0 | 0 |
| 136 -22-76 D N 6 12.0 136 -21-76 D N 10 15. 648 -21-76 D N 10 17.5 648 -21-76 D N 10 11.2 128 -21-76 D N 10 11.2 128 -21-76 D N 10 11.2 128 -21-76 D N 10 11.2 128 -21-76 D N 10 11.2 128 -21-76 D N 10 11.2 128 -21-76 D N 10 11.2 128 -21-76 D N 10 11.2 120 -21-76 D N 10 11.2 120 -21-76 D N 10 11.2 120 -21-76 D N 10 11.2 120 -21-76 D N 10 11.2 120 -21-76 D N 10 11.2 120 -21-76 D N 10 11.2 120 -21-76 D N 10 11.2 120 -21-76 D N 10 11.2 120 -21-76 D N 10 11.2 120 -21-76 D N 10 11.1 11.1 11.1 11.1 11.1 11.1 11.1 | -22-76 D | 4 | 7 | 38 | | | | | | | | | | | | 38 | 0 |
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| 128 | -21-76 D | O | | 648 | | | | | | | | | | | | 648 | C |
| 17. 17. 17. 18. 19. 19. 2 | -21-76 D | ω | 8 | 128 | | | | | | | | | | | | 128 | o C |
| 15-76 N W 20 17.5 N W 14 18.5 N W 15 1 17.7 N W 15 1 17.7 N W 15 1 17.8 N W | -21-76 D | 14 | α) | 17 | | | | | | | | | | | | 17 | C |
| 121-76 N M O 19.4 144 168 -21-76 N M 14 14.2 4 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 14.2 0 15.0 | -21-76 D | 20 | 7 | | | | | | | | | | | | | 0 | 0 |
| 142 142 142 142 142 142 142 142 142 143 15 150 15-76 0 2 23.8 476 15-76 0 0 23.8 476 4830 15-76 0 0 14.8 4830 4830 13-76 N C 0 15.2 4830 4830 13-76 N C 2 17.7 4830 4830 13-76 N C 2 17.7 2039 2039 13-76 N C 6 17.3 743 22 15-76 D D 2 23.6 506 506 15-76 D D 2 33.8 348 348 15-76 D D 2 33.6 348 348 15- | -21-76 N | 0 | თ | | | | 24 | | | | | | | | | 168 | 0 |
| 15-76 N M 14 18.5 150 | -21-76 N | æ | ნ | | | | | | | | | | | | | 142 | 0 |
| -15-76 N 20 18.5 XX: 21 150 150 150 2638 2648 2648 2648 2648 2648 2648 2648 2648 2658 2648 2658 2648 2658 <td>-21-76 N</td> <td>4</td> <td>ω.</td> <td></td> <td>0</td> <td>0</td> | -21-76 N | 4 | ω. | | | | | | | | | | | | | 0 | 0 |
| -15-76 D C 2 3.8 2638 476 -15-76 D C 4 23.8 476 448 -15-76 D C 2 3.5 4265 4265 -13-76 N C 2 17.7 4830 4830 -13-76 N C 2 17.7 2039 2039 -13-76 N C 2 17.3 743 2039 -13-76 N C 2 17.3 743 2039 -15-76 D D 2 23.6 506 -15-76 D D 2 23.6 506 -15-76 D D 2 23.6 32.8 -15-76 D D 6 23.6 32.8 -13-76 N D 6 17.8 402 -13-76 N D 0 19.1 1111 -13-76 N D 0 19.1 1111 -13-76 N D 0 19.1 1111 < | -21-76 N | 20 | 80 | | | | | | | | | | | × | | 21 | 0 |
| -15-76 D C 2 23.8 2638 -15-76 D C 4 23.8 476 -13-76 N C 0 19.5 4265 -13-76 N C 2 17.7 4830 4830 -13-76 N C 4 17.7 2039 2039 -13-76 N C 6 17.3 743 2039 -15-76 D D 2 23.6 506 506 -15-76 D D 2 23.6 372 372 -15-76 D D 6 23.6 372 388 -15-76 D D 6 23.6 372 388 -15-76 D D 6 23.6 372 388 -13-76 N D 0 19.1 1111 1111 -13-76 N D 0 19.1 1111 </td <td>-15-76 D</td> <td>0</td> <td>4</td> <td>150</td> <td></td> <td>150</td> <td>С</td> | -15-76 D | 0 | 4 | 150 | | | | | | | | | | | | 150 | С |
| -15-76 D C 4 23.8 476 448 448 448 448 448 448 448 448 448 448 448 448 448 448 448 448 448 4265 4365 4365 4365 4365 436 5039 433 5039 433 433 5039 436 436 436 436 436 436 436 436 436 436 436 436 436 436 436 436 440 4402 4 | -15-76 D | 7 | Θ. | 2638 | | | | | | | | | | | | 2638 | 0 |
| -15-76 D C 6 23.6 448 4265 4265 4265 4265 4265 4265 4265 4265 4830 4402 <td>-15-76 D</td> <td>4</td> <td>ლ</td> <td>476</td> <td></td> <td>476</td> <td>0</td> | -15-76 D | 4 | ლ | 476 | | | | | | | | | | | | 476 | 0 |
| -13-76 N C 0 19.5 4265 4830 4402 </td <td>-15-76 D</td> <td>9</td> <td>ы</td> <td>448</td> <td></td> <td>448</td> <td>0</td> | -15-76 D | 9 | ы | 448 | | | | | | | | | | | | 448 | 0 |
| -13-76 N C 2 17.7 4830 -13-76 N C 4 17.7 2039 -13-76 N C 6 17.3 743 22 -15-76 D D 2 23.6 506 -15-76 D D 4 23.6 991 -15-76 D D 6 23.6 372 -15-76 N D 0 1111 -13-76 N D 0 1111 -13-76 N D 4 17.8 388 -13-76 N D 4 17.8 388 -13-76 N D 6 17.8 402 -13-76 N D 6 17.8 402 -13-76 N D 8 17.3 531 | -13-76 N | 0 | ნ | 4265 | | | | | | | | | | | | 4265 | 0 |
| -13-76 N C 4 17.7 2039 -13-76 N C 6 17.3 743 22 -15-76 D D 2 23.6 506 -15-76 D D 6 23.6 991 -15-76 D D 8 22.5 388 -15-76 D D 8 22.5 388 -15-76 D D 8 22.5 388 -13-76 N D 0 19.1 1111 -13-76 N D 0 11.1 -13-76 N D 2 17.8 388 -13-76 N D 4 17.8 388 -13-76 N D 6 17.8 402 -13-76 N D 6 17.8 402 -13-76 N D 8 17.3 531 | -13-76 N | 7 | 7 | 4830 | | | | | | | | | | | | 4830 | 0 |
| -13-76 N C 6 17.3 743 22 765 765 765 765 765 765 765 765 765 765 | -13-76 N | 4 | 7 | 2039 | | | | | | | | | | | | 2039 | 63 |
| -15-76 D D 2 4.4 -15-76 D D 2 23.6 506 -15-76 D D 4 23.6 991 -15-76 D D 6 23.6 372 -15-76 D D 8 22.5 388 -13-76 N D 0 19.1 1111 -13-76 N D 2 17.8 1916 -13-76 N D 4 17.8 388 -13-76 N D 6 17.8 402 -13-76 N D 8 17.3 531 | -13-76 N | 9 | ۲. | 743 | | | 22 | | | | | | | | | 765 | 45 |
| -15-76 D D 2 23.6 506 -15-76 D D 4 23.6 991 -15-76 D D 6 23.6 372 -15-76 D D 6 23.5 388 -15-76 N D 0 19.1 1111 -13-76 N D 2 17.8 1916 -13-76 N D 6 17.8 388 -13-76 N D 6 17.8 23 -13-76 N D 8 17.3 531 -13-76 N D 8 17.3 531 | -15-76 D | 0 | 4 | | | | | | | | | | | | | O | С |
| -15-76 D 4 23.6 991 -15-76 D 6 23.6 372 -15-76 D D 8 22.5 388 -13-76 N D 0 19.1 1111 -13-76 N D 2 17.8 1916 23 -13-76 N D 4 17.8 388 -13-76 N D 6 17.8 402 -13-76 N D 8 17.3 531 | -15-76 D | 7 | Э. | 506 | | | | | | | | | | | | 506 | 0 |
| -15-76 D 6 23.6 372 -15-76 D D 8 22.5 388 -13-76 N D 0 19.1 1111 -13-76 N D 2 17.8 1916 23 -13-76 N D 4 17.8 388 -13-76 N D 6 17.8 402 -13-76 N D 8 17.3 531 | -15-76 D | 4 | ლ | 991 | | | | | | | | | | | | 991 | 0 |
| -15-76 D D 8 22.5 388 388 1111 | -15-76 D | 9 | ლ | 372 | | | | | | | | | | | | 372 | 0 |
| -13-76 N D O 19.1 1111 -13-76 N D 2 17.8 1916 23 -13-76 N D 4 17.8 388 388 -13-76 N D 6 17.8 402 -13-76 N D 8 17.3 531 21 552 | -15-76 D | œ | ď | 388 | | | | | | | | | | | | 388 | 296 |
| -13-76 N D 2 17.8 1916 23 1939 -13-76 N D 4 17.8 388 388 -13-76 N D 6 17.8 402 -13-76 N D 8 17.3 531 552 | -13-76 N | 0 | 60 | | | | | | | | | | | | | 1111 | 447 |
| -13-76 N D 4 17.8 388 388 -13-76 N D 6 17.8 402 -13-76 N D 8 17.3 531 21 552 | -13-76 N | 7 | 7 | 1916 | | | 23 | | | | | | | | | 1939 | 1226 |
| -13-76 N D 6 17.8 402 402 -13-76 N D 8 17.3 531 21 552 | -13-76 N | 4 | 7 | 388 | | | | | | | | | | | | 388 | 41 |
| -13-76 N D 8 17.3 531 21 552 | -13-76 N | 9 | 7 | 402 | | | | | | | | | | | | 402 | 64 |
| | -13-76 N | œ | 7 | 531 | | | | | 21 | | | | | | | 552 | 0 |

Appendix 9. Continued.

| Sample Parameter | leters | | | | | ls | Species/Groups | /Group | v | | | | | | |
|------------------|---------------|-------|----|----|---------------|----|----------------|--------|----|----|---|----|--------|-----------------|----------|
| Date D1 Sta C | Temp Dpt C | AL | SP | SM | d. ≻ | 41 | QΓ | CP | BR | SS | S | FS | Misc. | Total Larvae | Eggs |
| | | | | | | | | | | | | | | 756 | , c |
| -15-76 D E | 21. | 364 | | | | | | | | | | | | 5 C | 0 0 |
| -15-76 D E | 20. | 6E | | | | | | | | | | | | 2 2 | c |
| -15-76 D E | 20. | 20 | | | | | | | | | | | | C | C |
| -15-76 D E | œ ; | Ü | | | | | | | | | | | | 56 | 0 |
| -17-76 N E | 21. | 9 0 0 | | | | | | | | | | | | 125 | 25 |
| -17-76 N E | 2.0 | 125 | | | 77 | | | | | | | | | 49 | 0 |
| 7-17-76 N E | 20 20.2 | 67 | | | † 1 | | | | | | | | | 0 | 0 |
| : | | | | | | | | | | | | | | | |
| -15-76 D | 25 | | | | | | | | | | | | | 0 1 | 0 0 |
| -15-76 D | 24 | ന | | | | | | | | | | | | 305 |) |
| 7-15-76 D G | 4 24.1 | 1155 | | | | | | | | | | | | 1155 | 0 0 |
| -15-76 D | 23 | - | | | | | | | | | | | | 1011 | 325 |
| -14-76 N | 2 | 9 | | | | | | | | | | | | 16/3 | 2 |
| -14-76 N | 2 | 1643 | | | | | | | | | | | | 2566 | 6 |
| -14-76 N | 21 | 2566 | | | | | | | | | | | | 4347 | c C |
| -17-76 N | 22 | ر. | | | | | | | | | | | | |) |
| - 45-76 D | 23 | 326 | | | | | | | | | | | | 326 | 0 |
| -15-76 | . 66 | 1345 | | | | | | | | | | | | 1345 | 0 |
| -15-76 0 | 22. | 160 | | | | | | | | | | | | 160 | 0 |
| 7-15-76 D H | 6 22.8 | 657 | | | | | | | | | | | | 657 | 0 |
| -15-76 D | 21. | 219 | | | | | | | | | | | | 219 | 0 |
| -17-76 N | 22. | 3539 | | | | | | | | | | | | 3539 | 0 |
| -17-76 N | 22. | 4633 | | | | | | | | | | × | XX: 33 | 4666 | 0 |
| -17-76 N | 22. | 5132 | | | | | | | | | | | | 5132 | 0 (|
| -17-76 N | 22. | 5365 | | | | | | | | | | | | 5365 | 0 (|
| -17-76 N | 22. | 6391 | | | | | | | | | | | | 6391 | 0 |
| | Ĺ | | | | | | | | | | | | | 0 | 0 |
| 7-30-76 D N | 0 72 0 | | | | | | | | | | | | | 0 | 0 |
| -30-76 0 | 7 6 | ç | | | | | | | | | | | | 69 | 0 |
| -30-76 U | . 74 | 60 | | | | | | | | | | | | , | |
| 0 3C 3F | 60 | 47 | | | | | | | | | | | | 78 | 0 |
| 7-15-76 D P | 0.62.0 | С | | | | | | | | | | | | 2038 | 28 |
| -15-76 | . 60 | 1073 | | | | | | | | | | | | 1073 | 0 |
| -15-76 0 | 22 | 818 | | | | | | | | | | | | 818 | 37 |
| -14-76 N | α. | 897 | | | | | | | | | | | | 897 | 75 |
| -14-76 N | <u>«</u> | 597 | | | | | | | | | | | | 597 | 16587 |
| N 9/ 17 | 17 | 2583 | | | 28 | | | | | | | | | 2611 | 20127 |
| N 9/ +1 | | 1058 | | | | | | | | | | | | 1058 | 19475 |
| | • |) | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

Appendix 9. Continued.

| Sample | Para | ameter | ters | | | | | š | Species/Groups | /Group | S. | | | | | | |
|-----------|------|----------|----------------|------|----|-----|----|-----|----------------|--------|----|----|-----|-----|-------|-----------------|------|
| Date Di | Sta | Dpt | Temp | AL | SP | WS. | γÞ | 4 L | 9 | CP | BR | SS | S S | F.S | Mtsc. | Total Larvae | Eggs |
| 16.76 | 3 | | | 470 | | | | | | | | | | | | 170 | C |
| -15-76 | ₹ 3 | ο α | - c | 2 | | | | | | | | | | | | 0 | 0 |
| 7-15-76 D | : 3 | 4 | 20.6 | 20 | | | | | | | | | | | | 20 | 0 |
| -15-76 | 3 | 20 | Ö | | | | | | | | | | | | | 0 | 0 |
| -17-76 | 3 | 0 | ÷. | 54 | | | | | | | | | | | | 54 | 0 |
| -17-76 | 3 | œ | _ . | 127 | | | | | | | | | | | | 127 | 0 0 |
| -17-76 | 3 | 14 | | 56 | | | | | | | | | | | | 26 40 | 0 |
| -17-76 | 3 | 20 | . | 9/ | | | | | | | | | | | | 9 | > |
| -17-76 | 4 | 0 | 2 | 1995 | | | | | | | | | | | | 1995 | 0 |
| 1 | 4 | က | 22.5 | 468 | | | | | | | | | | | | 468 | 0 |
| -17-76 | 4 | 9 | 6 | ທ | | | | | | | | | | | | 1555 | 0 |
| -17-76 | 4 | 6 | 2 | 4174 | | | | | | | | | | | | 4174 | С |
| 15-76 | 4 | 12 | 22.5 | - | | | | | | | | | | | | 3158 | 0 |
| 1 | ı | (| | | | | | | | | | | | | | 1634 | c |
| -17-76 | טו | ٠ د | | 1634 | | | | | | | | | | | | 1 C C C | o c |
| 9/-/1- | ומ | 4 (| v. | 683 | | | | | | | | | | | | 394 | o c |
| 7-17-76 0 | ប្រ | χÇ | 23.8 | 291 | | | | | | | | | | | | 260 | 0 |
| -11-16 | ט ט | 2 4 | V + | 330 | | | | | | | | | | | | 330 | 0 |
| 0/-/1- | n | <u>n</u> | - | 086 | | | | | | | | | | | | |) |
| -17-76 | 9 | 0 | 2 | 1674 | | | | | | | | | | | | 1674 | 0 |
| 7-17-76 D | 9 | 4 | 22.0 | 435 | | | | | | | | | | | | 435 | 0 |
| -17-76 | 9 | 6 | S. | | | | | | | | | | | | | 0 | 0 |
| -17-76 | ဖ | 4 | - | 56 | | | | | | | | | | | | 56 | 0 |
| -17-76 | 9 | 18 | _ | 54 | | | | | | | | | | | | 54 | 0 |
| - 10-76 | | C | ς. | | | | | | | | | | | | | 0 | 0 |
| -10-76 | | 7 | 2 | 80 | | | | | | | | | | | | 80 | 0 |
| - 10-76 | | 4 | α. | | | | | | | | | | | | | 0 | 0 |
| -10-76 | | 9 | 2 | 163 | | | | | | | | | | | | 163 | 0 |
| -10-76 | | 0 | <u>.</u> | 69 | | | | | | | | | | | | 69 | 0 |
| 8-10-76 N | ပ | 7 | 21.0 | 72 | | | | | | | | | | | | 72 | 0 |
| -10-76 | | 4 | - | 46 | | | | | | | | | | | | 46 | 0 |
| -11-76 | | 9 | Ö | 73 | | | | | | | | | | | | 73 | 0 |
| | | | | | | | | | | | | | | | | | |

Appendix 9. Continued.

| Sample Par | Parameter | ters | | | | | 1S | Species/Groups | 'Group | S | | | | | | |
|-------------|---------------|----------------|------|----|----|------------|----|----------------|--------|----|----|----|----|-------|--|------|
| Date DI Sta | t Opt | Temp | AL | SP | SM | d > | 41 | 9 | 80 | BR | SS | SN | FS | Misc. | Total Larvae | Eggs |
| 01.04 | 9 | | | | | | | | | | | | | | | |
| 8-10-76 U U | ى د | 22.3 | 79 | | | | | | | | | | | | 62 | 0 0 |
| -10-76 | ۱ 4 | | | | | | | | | | | | | | o c | > 0 |
| -10-76 D | ဖ | | | | | | | | | | | | | | c | o c |
| -10-76 D | 80 | ς. | 31 | | | | | | | | | | | | 31 | |
| -11-76 N | 0 | _ . | 260 | | | | | | | | | | | | 560 | 0 |
| -11-76 N | 7 | _ | 396 | | | | | | | | | | | | 396 | 0 |
| -11-76 N | 4 | | | | | | | | | | | | | | 132 | 0 |
| -11-76 N | 9 | | | | | | | | | | | | | | 154 | 0 |
| -11-76 N | œ | <u>.</u> . | | | | | | | | | | | | | 126 | 0 |
| -10-76 D | 0 | | 56 | | | | | | | | | | | | 56 | C |
| -10-76 D | 80 | | | | | | | | | | | | | | 2 | c |
| 8-10-76 D E | 4 | 15.4 | 33 | | | | | | | | | | | | 33 | 0 |
| -10-76 D | 20 | | | | | | | | | | | | | | 0 | o C |
| -10-76 N | 0 | | 116 | | | | | | | | | | | | 116 | 0 |
| -10-76 N | 80 | | 32 | | | | | | | | | | | | 32 | 0 |
| -10-76 N | 14 | | 155 | | | | | | | | | | | | 155 | 0 |
| - 10-76 N | 20 | | | | | | | | | | | | | | 0 | 0 |
| - 40-76 | (| · | 7.7 | | | | | | | | | | | | t | , |
| 0 9/-01- | > (| , , | | | | | | | | | | | | | 72 | 0 |
| -10-76 D | N 5 | <u> </u> | 9690 | | | | | | | - | | | | | 969 | 0 0 |
| -10-76 | ט ז | | | | | | | | | | | | | | 161 | > 0 |
| 8-10-76 N G | 0 | 21.6 | 97 | | | | | | | | | | | | 267 | o c |
| -10-76 N | 7 | _ . | 25 | | | | | | | | | | | | 25 | 0 |
| -10-76 N | 4 | ÷. | 169 | | | | | | | | | | | | 169 | 0 |
| -10-76 N | 9 | <u>.</u> | 96 | | | | | | | | | | | | 96 | 0 |
| -10-76 D | 0 | ~ | 47 | | | | | | | | | | | | 47 | c |
| -10-76 D | 7 | ~ | 198 | | | | | | | | | | | | 198 | 0 |
| -10-76 D | 4 | - | 189 | | | | | | | | | | | | 189 | 0 |
| 8-10-76 D H | 9 | 21.7 | | | | | | | | | | | | | 0 | 0 |
| -10-76 D | œ | - | | | | | | | | | | | | | 0 | 0 |
| -10-76 N | 0 | - | 533 | | | | | | | | | | | | 533 | 0 |
| -10-76 N | 7 | - | 175 | | | | | | | | | | | | 175 | 0 |
| -10-76 N | 4 | - | 48 | | | | | | | | | | | | 48 | 0 |
| -10-76 N | ဖ | - | 265 | | | | | | | | | | | | 265 | 0 |
| -10-76 N | œ | - | 264 | | | | | | | | | | | | 264 | 0 |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | - | | - | - | - | | THE REAL PROPERTY AND ADDRESS OF THE PERSON NAMED IN COLUMN 2 IS NOT THE PERSON NAMED IN COLUMN 2 IS N | |

Appendix 9. Continued.

| Date Di Sta Dpt C Contact Co | Sample | | aram | Parameter | s, | | | | | Ś | Species/Groups | /Group | ñ | | | | | |
|--|---------|-----|------|-----------|----------------|-----|----|---|----|-----|----------------|--------|----|----|----|-------|-----------------|------|
| 10 | ø) | s - | 1 | ٠ ـ | o C D | AL | SP | S | γp | 4 H | ۵۲ | СР | BR | SS | NS | Misc. | Total Larvae | Eggs |
| 10 | - 10-7 | | | | c | 5.3 | | | | | | | | | | | 60 | |
| 150 | -03-7 | | | | ; - | 297 | | | | | | | | | | | 297 | o c |
| 28 | -10-7 | | | | ď | 150 | | | | | | | | | | | 150 | 0 |
| 125 1076 N N O 211.2 125 1076 N N O 211.2 36 1076 D R O 23.5 1076 D R A 23.0 1076 D R R A 23.0 1076 D R R A 23.0 1076 D R R A 23.0 1076 D N R A 22.2 169 1076 D W R B 15.9 40 1076 D W R D 21.5 190 1076 D W W M M M M M M M M M M M M M M M M M | -03-7 | | | | <u>.</u> | 28 | | | | | | | | | | | 28 | 0 |
| 10-76 N N 2 21.2 36 10-76 D R 0 23.2 10-76 D R 2 23.5 10-76 D R 2 23.5 10-76 D R 2 22.2 120 10-76 N R 2 22.2 120 11-76 N R 2 22.0 120 11-76 N R 2 22.0 120 11-76 N R 3 22.0 120 11-76 N R 4 3 21.0 643 11-76 N R 4 2 21.0 144 | - 10-7 | | | | - | 125 | | | | | | | | | | | 125 | 617 |
| -10-76 D R 23.2 -10-76 D R 23.5 -10-76 D R 23.5 -10-76 D R 23.5 -10-76 D R 2 23.6 -10-76 D R 2 23.6 -10-76 D R 2 22.2 -10-76 D R 2 22.2 -10-76 D W 2 22.2 -10-76 D W 8 19.5 -1 | - 10-7 | | | | _ | 36 | | | | | | | | | | | 96 | 0 |
| 10-76 D R 2 23.5 1-10-76 D R 4 2 23.6 1-10-76 D R 6 22.8 1-10-76 D R 6 22.8 1-10-76 D R 7 2 22.2 1-10-76 D W 8 19.5 1-10-76 D W 9 19.5 1-10-76 D W | - 10-7 | | | 2 | 6 | | | | | | | | | | | | c | c |
| 10-76 D R 4 23.0 42 10-76 D R 8 0 21.8 288 10-76 N R 2 22.2 120 10-76 N R 2 22.2 120 10-76 N R 2 22.2 120 10-76 N R 6 22.2 169 10-76 N R 19 5 10-76 D W 0 21.5 190 10-76 D W 19 5 10-76 D W 19 5 10-76 D W 19 5 10-76 D W 19 5 10-76 D W 19 5 10-76 D W 19 5 10-76 D W 19 5 10-76 D W 20 15 9 33 10-76 D W 20 15 9 33 10-76 D W 20 15 9 33 10-76 D W 20 15 9 33 10-76 D W 20 15 9 93 10-76 D W 20 15 9 93 10-76 D W 20 15 9 93 10-76 D W 20 15 9 93 10-76 D W 20 15 9 93 10-76 D W 20 15 9 93 10-76 D W 20 15 9 95 10-76 D W 20 10 882 11-76 N 4 0 21:0 882 11-76 N 4 0 21:0 144 | -10-7 | | | 1 (2) | ი | | | | | | | | | | | | o c | o C |
| 21-10-76 N R 6 22.8 21 22 120 120 120 120 120 120 120 120 1 | -10-7 | | | 2 | (0) | 42 | | | | | | | | | | | 42 | 0 |
| 288 | -10-7 | | | 7 | 6 | 21 | | | | | | | | | | | 21 | o C |
| 120 1076 N R 2 22.2 120 105 1076 N R 6 22.2 169 1076 N R 6 22.2 169 1076 D W 14 15.9 190 1076 D W 18 19.5 1076 D W 18 19.5 1076 N W 20 21.5 62 1076 N W 20 15.9 33 1076 N W 20 15.9 33 1077 N M 20 15.9 195 1077 N M 20 15.9 195 1078 N M 20 15.9 195 1078 N M 20 15.9 195 1078 N M 20 15.9 195 1078 N M 20 15.9 195 1078 N M 20 15.9 195 1078 N M 20 15.9 195 1078 N M 20 15.9 195 1078 N M 20 10.0 140 1178 N M 20 10.0 140 1178 N M 20 10.0 144 1178 N M 20 10.0 144 1178 N M 20 10.0 144 | - 10-7 | | | 7 | - : | 288 | | | | | | | | | | | 288 | C |
| 105 | -10-7 | | | 7 | 2 | 120 | | | | | | | | | | | 120 | 0 |
| 140-76 N R 6 22.2 169 190 190 190 190 190 190 190 190 190 19 | -10-7 | | | 7 | ď | 105 | | | | | | | | | | | 105 | 0 |
| 190 -10-76 D W 8 19.5 -10-76 D W 8 19.5 -10-76 D W 8 19.5 -10-76 D W 14 15.9 -10-76 D W 14 15.9 -10-76 D W 20 15.9 -10-76 N W 14 15.9 -10-76 N W 14 15.9 -10-76 D W 20 15.9 -10-76 D W 2 | -10-7 | | | CA | 5 | 169 | | | | | | | | | | | 169 | 0 |
| 10-76 D W 10 1.15 190 190 190 190 190 190 190 190 190 190 | | | | (| | | | | | | | | | | | | | |
| 10-76 D W 8 19.5 10-76 D W 8 19.5 10-76 D W 20 15.9 33 10-76 D W 20 15.9 33 10-76 D W 20 15.9 33 10-76 D W 20 15.9 10-76 | -10-76 | | | | <u> </u> | | | | | | | | | | | | 190 | 0 |
| 10-76 D W 14 15.9 40 10-76 D W 20 15.9 33 10-76 N W 20 15.9 33 10-76 N W 14 15.9 10-76 N W 20 15.9 10-76 N W 20 15.9 10-76 D 4 0 24.0 10-76 D 4 0 24.0 10-76 D 4 0 22.0 10-76 D 4 12 21.0 11-76 N 4 0 21.0 882 11-76 N 4 0 21.0 643 11-76 N 4 0 21.0 140 11-76 N 4 12 21.0 140 11-76 N 4 12 21.0 140 | - 10-76 | | | - | വ | ! | | | | | | | | | | | 0 | 0 |
| -10-76 D W 20 15.9 33 62 62 62 62 62 62 62 62 62 62 62 62 62 | - 10-76 | | | da. | വ | 40 | | | | | | | | | | | 40 | 0 |
| -10-76 N W O 21.5 62 -10-76 N W B 19.5 -10-76 N W 18 19.5 -10-76 N W 20 15.9 -10-76 N W 20 15.9 -10-76 D 4 0 24.0 -10-76 D 4 3 23.5 -10-76 D 4 9 22.0 -10-76 D 4 12 21.0 -10-76 D 4 12 21.0 -11-76 N 4 0 21.0 882 -11-76 N 4 12 21.0 140 -11-76 N 4 12 21.0 144 -11-76 N 4 12 21.0 144 | - 10-76 | | | _ | 2 | 33 | | | | | | | | | | | 33 | 0 |
| -10-76 N W 8 19.5 -10-76 N W 14 15.9 -10-76 N W 14 15.9 -10-76 N W 20 15.9 -10-76 D 4 0 24.0 -10-76 D 4 3 23.5 -10-76 D 4 6 23.0 -10-76 D 4 9 22.0 -10-76 D 4 9 22.0 -10-76 N 4 0 21.0 -11-76 N 4 6 21.0 -11-76 N 4 9 21.0 -11-76 N 4 12 21.0 -11 | - 10-76 | | | 7 | <u>.</u> | 62 | | | | | | | | | | | 62 | 0 |
| -10-76 N W 14 15.9 -10-76 N W 20 15.9 -10-76 N W 20 15.9 -10-76 D 4 3 23.5 -10-76 D 4 6 23.0 -10-76 D 4 6 23.0 -10-76 D 4 9 22.0 -10-76 D 4 12 21.0 -10-76 N 4 0 21.0 -11-76 N 4 0 21.0 -11-76 N 4 0 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 | - 10-76 | | | _ | ნ | | | | | | | | | | | | 0 | 0 |
| -10-76 N W 20 15.9 -10-76 D 4 0 24.0 -10-76 D 4 3 23.5 -10-76 D 4 6 23.0 -10-76 D 4 9 22.0 -10-76 D 4 12 21.0 -11-76 N 4 0 21.0 -11-76 N 4 6 21.0 -11-76 N 4 9 21.0 -11-76 N 4 9 21.0 -11-76 N 4 9 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 | - 10-76 | | | _ | | | | | | | | | | | | | 0 | O |
| -10-76 D 4 0 24.0 -10-76 D 4 3 23.5 -10-76 D 4 6 23.0 -10-76 D 4 6 23.0 -10-76 D 4 9 22.0 -10-76 D 4 12 21.0 -11-76 N 4 0 21.0 -11-76 N 4 6 21.0 -11-76 N 4 9 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 -11-76 N 4 12 21.0 | - 10-76 | | | - | ري | | | | | | | | | | | | 0 | 0 |
| -10-76 D 4 3 23.5 72 -10-76 D 4 6 23.0 37 -10-76 D 4 9 22.0 -10-76 D 4 12 21.0 -11-76 N 4 0 21.0 643 -11-76 N 4 6 21.0 140 -11-76 N 4 9 21.0 95 -11-76 N 4 12 21.0 144 | -10-76 | | | 2 | 4 | | | | | | | | | | | | С | C |
| -10-76 D 4 6 23.0 37 -10-76 D 4 9 22.0 -10-76 D 4 12 21.0 -11-76 N 4 0 21.0 882 -11-76 N 4 6 21.0 140 -11-76 N 4 12 21.0 144 -11-76 N 4 12 21.0 144 | - 10-76 | | | 7 | 6 | 72 | | | | | | | | | | | 7.2 | c |
| -10-76 D 4 9 22.0 -10-76 D 4 12 21.0 -11-76 N 4 0 21.0 882 -11-76 N 4 3 21.0 643 -11-76 N 4 6 21.0 140 -11-76 N 4 9 21.0 95 -11-76 N 4 12 21.0 144 | - 10-76 | | | 2 | e | 37 | | | | | | | | | | | 3. | 0 0 |
| -10-76 D 4 12 21.0 882 -11-76 N 4 0 21.0 882 -11-76 N 4 3 21.0 643 -11-76 N 4 6 21.0 140 -11-76 N 4 9 21.0 95 -11-76 N 4 12 21.0 144 | -10-76 | | | ~ | ~ | | | | | | | | | | | | ; < | c |
| -11-76 N 4 0 21.0 882 -11-76 N 4 3 21.0 643 -11-76 N 4 6 21.0 140 -11-76 N 4 9 21.0 95 -11-76 N 4 12 21.0 144 | - 10-76 | | - | 7 | <u>.</u> | | | | | | | | | | | | c | o c |
| -11-76 N 4 3 21.0 643 -11-76 N 4 6 21.0 140 -11-76 N 4 9 21.0 95 -11-76 N 4 12 21.0 144 | -11-76 | | | 7 | _ | 882 | | | | | | | | | | | 882 | o c |
| -11-76 N 4 6 21.0 140 140 140 140 140 95 95 95 95 11-76 N 4 12 21.0 144 | -111-76 | | | 7 | _ | 643 | | | | | | | | | | | 643 | c |
| -11-76 N 4 9 21.0 95 95 | -11-76 | | | | _ | 140 | | | | | | | | | | | 140 | c |
| -11-76 N 4 12 21.0 144 | -11-76 | | | | - | 95 | | | | | | | | | | | 95 | o C |
| | -11-76 | | _ | | _ | 144 | | | | | | | | | | | 144 | C |
| | | | | | | | | | | | | | | | | | | |

Appendix 9. Continued.

| Sample | 9 | arameter | ters | | | | | Sp | Species/Groups | Groups | (0 | | | | | | |
|--------------|------------|----------|-------------|-----|----|----|----|-----|----------------|--------|----|----|----|----|-------|-----------------|------------|
| Date D | ı St | а Ор | Temp t C | AL | SP | SM | γp | 1.P | 9 | CP | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| - 10-76 | | 0 | 21 | 56 | | | | | | | | | | | | 56 | 0 |
| -10-76 | | 4 (| 21 | 62 | | | | | | | | | | | | 62 | 0 |
| -10-76 | | æ 5 | 7 5 | 53 | | | | | | | | | | | | 23 | 00 |
| -10-76 | | 5 | 8 | | | | | | | | | | | | | o c | 0 |
| -11-76 | | 0 | 21 | 410 | | | | | | | | | | | | 4 10 | 0 |
| -11-76 | | 4 | 21 | 20 | | | | | | | | | | | | 20 | 0 |
| -11-76 | | ω (| 21 | | | | | | | | | | | | | 0 | 0 |
| 1-76 1-76 | z z v v | 15 | 21.12 | 146 | | | | | | | | | | | | 146 153 | 00 |
| | | (| Ċ | | | | | | | | | | | | | • | . (|
| -10-76 | | 0 4 | . 0 | | | | | | | | | | | | |) | O C |
| -10-76 | | 6 | . 61 | | | | | | | | | | | | | 0 | c |
| - 10-76 | _ | 4 | 16. | | | | | | | | | | | | | 0 | 0 |
| - 10-76 | - | 18 | 16. | | | | | | | | | | | | | 0 | 0 |
| - 10-76 | _ | ۰ ۰ | 21. | (| | | | | | | | | | | | 0 | 0 |
| -10-76 | | 4 (| 0, 0 | | | | | | | | | | | | | 66 | 0 (|
| -10-76 | | ה א | . u | 7 6 | | | | | | | | | | | | 7.4 | 0 0 |
| 8-10-76 | 9 2 | 8 | 16.7 | 25 | | | | | | | | | | | | 25 25 | 0 |
| | | | | | | | | | | | | | | | | | , |
| -14-76 | | 0 0 | 22. | | | | | | | | | | | | | 0 0 | 00 |
| -14-76 | | 4 A | 2 6 | | | | | | | | | | | | | > 0 | > < |
| -14-76 | | . 0 | 20. | | | | | | | | | | | | | 0 | 0 |
| -15-76 | | 0 | 20. | | | | | | | | | | | | | 0 | 0 |
| -15-76 | | 7 | 20. | | | | | | | | | | | | | 0 | 0 |
| 9-14-76 | zz | 4 0 | 20.2 | | | | | | | | | | | | | 00 | 00 |
| -14-76 | | C | 2.1 | | | | | | | | | | | | | c | C |
| -14-76 | | 2 | 19 | | | | | | | | | | | | | o c | o c |
| -14-76 | | 4 | 19 | | | | | | | | | | | | | 0 | 0 |
| -14-76 | | ဖ | 19. | | | | - | | | | | | | | | 0 | 0 |
| -14-76 | | œ | 19. | | | | | | | | | | | | | 0 | 0 |
| -14-76 | | 0 | 19. | | | | | | | | | | | | | 0 | 0 |
| -14-76 | | 0 1 | 6 | | | | | | | | | | | | | 0 (| 0 |
| 9-14-76 | 2 Z | 4 (C | 0 ec | | | | | | | | | | | | | 0 0 | 0 0 |
| -14-76 | | · ∞ | 8 | 64 | | | | | | | | | | | | 64 | 0 |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | - | | | | | |

Appendix 9. Continued.

| Sta Dpt Temp Total SM YP TP JD CP BR SS NS FS Misc. Larvae Eggs G 2 21.5 2 21.5 C 2 21.5 C | Sta Dpt Temp AL SP NP TP UD CP BR SS NS FS Misc. Larvae Fgg G 2 21.0 C 2 21.0 C | Temp Temp Temp Temp Temp Temp Temp Temp | Sample Parameter | ers | | | | | <i>5</i> 5 | Species/Groups | /Group | ŵ | | | | | | |
|--|--|--|------------------|-----|--------|----|----|-----|------------|----------------|--------|----|----|---------|----|-------|-----------------|---------------|
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Appendix 9. Continued.

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| 2 14.1 4 14.1 6 13.8 0 14.3 2 13.5 4 13.5 | 2 4 4 9 0 0 0 4 9 9 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 | R 0 14 | | | | | | | | | | | | 0 | 0 |
| 4 14.1 6 13.8 0 14.3 2 13.5 4 13.5 | 4 0 0 0 4 9 4 4 4 4 4 4 4 4 4 4 4 4 4 4 | R 2 14 | | | | | | | | | | | | 0 | 0 |
| 6 13.8 0 14.3 2 13.5 4 13.5 | 6 13 0 0 14 13 13 15 15 15 15 15 15 15 15 15 15 15 15 15 | R 4 14 | | | | | | | | | | | | 0 | 0 |
| 0 14.3 2 13.5 4 13.5 | 0 14 0 4 13 0 113 123 | R 6 13 | | | | | | | | | | | | 0 | 0 |
| 2 13.5 4 13.5 5 10.5 | 2 13 4 13 6 12 | R 0 14 | | | | | | | | | | • | | 0 | 0 |
| 4 13.5 | 4 13 6 12 | R 2 13 | | | | | | | | | | | | 0 | 0 |
| | 6 12 | 4 13 | | | | | | | | | | | | 0 | 0 |
| 9 | | R 6 12 | | | | | | | | | | | | С | С |

Appendix 10. Densities (no./1,000 m 3) for fish eggs and larvae collected at beach (A, B, F) and open water (C, D, G, H, E, W, R) stations in Cook Plant study areas, southeastern Lake Michigan, 1977.

| Date DI Sta Dpt C AL SP SW YP TP UD CP BR SS NS F5 MISC. Larvee Eggs 11-17-77 D A 0 13-8 | Sample Par | Parameter | ers | | | | | Š | Species/Groups | /Group | S | | | | | | |
|---|------------|-----------|------------------------------|----|----|----|----|---|----------------|--------|----|----|-------|----|-------|---------------------|---------------------|
| D A 0 13.8 N A 0 11.2 N B 0 10.5 N B 0 10.5 N B 0 10.5 N B 0 10.5 N C 12.2 N C 12.2 N C 17.0 N A 0 17.0 N A 0 17.5 N B 0 16.8 N B 0 16.8 N B 0 16.8 N B 0 16.8 N B 0 17.5 N B 0 17.5 N A 0 17.5 N B 0 16.8 N B 0 16.8 N B 0 17.5 N B 0 16.8 N B 0 16.8 N B 0 17.5 N B 0 17.5 N A 0 17.5 N A 0 17.5 N A 0 14.2 168 | 1 1 | | - | AL | SP | SM | 4 | 4 | g, | СР | BR | SS | NS NS | FS | Misc. | Total Larvae | Eggs |
| N A O 11.2 N B O 13.5 N B O 12.2 N F O 17.0 N A O 17.5 N B O 17.5 | 0 | 00 | | | | | | | | | | | | | | 00 | 00 |
| D 8 0 13.5 N 8 0 13.5 N 8 0 10.5 N 7 10.8 N 8 0 17.0 N 9 17.0 N 9 17.5 N 9 17.5 N 9 17.5 N 17.5 17.5 N 17.5 17.6 N 18 0 17.5 N 18 0 17.5 N 18 0 17.5 N 18.1 17.0 N 19.1 17.0 N 19.2 17.0 N 19.2 17.0 N 19.2 17.0 N 19.2 18.0 N 19.2 19.0 N 19.2 <td< td=""><td>zz</td><td>000</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>000</td><td>000</td></td<> | zz | 000 | | | | | | | | | | | | | | 000 | 000 |
| N F O 12.2 O 12.2 O O O O O O O O O | | 0000 | | | | | | | | | | | | | | 0000 | 0000 |
| 0 4 0 17.0 N A 0 17.5 N B 0 17.5 N B 0 16.8 N B 0 17.5 N B 0 17.5 N F 0 18.1 N F 0 17.0 N F 0 15.4 N A 0 15.4 N A 0 15.4 N A 0 14.2 N A 0 14.2 N A 0 14.2 | | 0000 | | | | | | | | | | | | | | 0000 | 0000 |
| D B C 16.8 0 16.8 N B C 17.5 17.5 N B C 17.5 17.5 N B C 17.5 18.1 D F C 18.1 18.1 N F C 17.0 17.0 D A C 17.0 17.0 D A C 17.0 17.0 N A C 17.2 17.0 N A C 14.2 168 B A C 14.2 168 | 0022 | 0000 | | | | | | | | | | | | | | 0000 | 0000 |
| D F 0 18.1 N F 0 17.0 N F 0 17.0 D A 0 15.4 N A 0 14.2 N A 0 14.2 N A 0 14.2 N A 0 14.2 | 0022 | 0000 | 16.8 16.8 17.5 17.5 | | | | | | | | | | | | | 0000 | 0000 |
| -77 D A O 15.4 79 79 79 79 79 79 79 79 79 79 79 79 79 | | 0000 | 18.1 18.1 17.0 17.0 | | | | | | | | | | | | | 0000 | 0000 |
| | 0022 | 0000 | ប្រភុ | 79 | | | 84 | | | | | | | | | 0 79 0 252 | 0 159 78 0 |

Appendix 10. Continued.

| Sample | Para | Parameter | ers | | | | | 35 | Species/Groups | Group | ผู | | | | | | |
|-----------|---------|---------------|--------------|------------|-------|------------|--------|------|----------------|-------|----|------|----|----|---------|-----------------|------------|
| Date D1 | Sta | Dpt | Temp | AL | SP | ₩ S | ۶ م | 16 | 9 | CP | BR | \$\$ | SN | FS | Misc. | Total Larvae | Eggs |
| | | | | | | | | | | | | | | | | c | c |
| -13-77 | 8 | 0 | • | | | | | | | | | | | | | 85 | C |
| -13-77 | 8 | 0 | • | 82 | | | | | | | | | | | | 77 | 154 |
| 6-13-77 N | 8 | 0 | 14.5 | 11 | | | | | | | | | | | | 88 | 88 |
| -13-77 | 8 | 0 | • | 88 | | | | | | | | | | | | ! | |
| 77-11- | ш | c | | 230 | | | | | | | | | | | | 230 | 234 |
| -13-77 | | 0 | |) | | | | | | | | | | | | o ; | 523 |
| 6-13-77 N | . 1 | 0 | 14.2 | 132 | | | | | | | | | | | | 32 | 110 |
| -13-77 | i. | 0 | • | | | | | | | | | | | | |) | ! - |
| | • | C | c | 1265 | 505 | | | | | | | | | | | 1771 | 3295 |
| - 12-17 | ۷. | 0 | v c | 7283 | 200 | | | | | | | | | | | 3796 | 206 |
| -12-77 | ∢ • | > (| , (| 2103 | 090 | | | 1041 | | | | | | | | 1821 | 260 |
| 7-12-77 N | ∢ < | 0 0 | 22.5 22.5 | 2990 | 4557 | | | | 1041 | | | | | × | XP: 130 | 8718 | 0 |
| -17-71 | 4 | > | | 000 |) | | | | | | | | | | | | 1 |
| - 12-77 | | C | 0 | 10480 | 374 | | | | | | | | | | | 10854 | 374 |
| 1121 | | c | · C | 2994 | | | | | | | | | | | | 2994 | 181 |
| -12-77 | 0 00 | 0 | 23.0 | 21458 | 32203 | | | | | | | | | | | 53661 | o c |
| 7-12-77 N | | 0 | 3 | 11290 | 24858 | | | | | | | | | | | 36 146 | > |
| | | • | | , | | | | | | | | | | | | 420 | 0 |
| -12-77 | | 0 | 23.1 | 420 | 0 | | | | | | | | | | | 29225 | 0 |
| -12-77 | | 0 | 23.1 | 29015 | 210 | | | | | | | | | | | 7728 | 0 |
| 7-12-77 N | <u></u> | 0 0 | 20.0 | 4884 | 16425 | | | | | | | | | | | 21255 | 0 |
| 71 | | • |) |)) | | | | | | | | | | | | 7007 | C |
| 74-60- | | 0 | ю | 8 10 | 813 | | | | | | | | | | | 1023 | o c |
| -09-77 | | 0 | Ю. | 648 | | | | | | | | | | | | 783 | o |
| - 10-77 | | 0 | 6 | 466 | 116 | | | | | | | | | | | 700 | o c |
| 8-10-77 N | ۷. | 0 | | | 116 | | | | | | | | | | | 9 | |
| | | • | | 0 | | | | | | | | | | | | 1208 | 0 |
| -09-77 | | 0 (| 70 (| 1208 | | | | | | | | | | | | 302 | 0 |
| 8-09-77 D | 80 | 0 (| 23.0 | 305 | 4 | | | | | | | | | | | 145 | 0 |
| - 10-77 | | O | n (| | 2 | | | | | | | | | | | 290 | 0 |
| -10-11 | | 0 | 7 | 730 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

Appendix 10. Continued.

| B-09-77 D F 0.22.5 190 P TP JD CP BR SS NS FS Misc. Larvae Eggs B-09-77 D F 0.22.5 1140 | D1 Sta Dpt C | Sample | | ara | Parameters | er s | | | | | S | Species/Groups | /Group | sc | | | | | | |
|--|---|----------|---|-----|------------|------|------|----|----|----|----|----------------|--------|----|-----|----|----|-------|-----------------|------|
| 190 | D F 0 22.5 190 N F 0 22.5 140 N F 0 24.3 828 N A 0 18.5 250 N A 0 18.5 250 N B 0 18.3 781 N B 0 18.0 6799 N F 0 13.9 380 N A 0 13.9 380 N F 0 13.0 333 N B 0 13.1 185 N B 0 13.3 185 N F 0 13.3 185 N F 0 13.3 185 N F 0 12.5 113 | | | | | Temp | AL | SP | SM | γP | TP | ٩٥ | СР | BR | \$8 | NS | FS | M SC. | rotal Larvae | Eggs |
| 140 | N F 0 22 5 1140 | 8-09-77 | ۵ | ıL | 0 | 22.5 | 190 | | | | | | | | | | | | 190 | |
| N F 0 24.3 828 828 N F 0 24.3 828 828 N A 0 18.5 250 2486 N A 0 18.0 781 781 D B 0 18.0 781 781 N B 0 18.0 781 781 N B 0 18.0 781 781 N B 0 18.0 788 879 D F 0 13.9 380 6799 N A 0 11.7 105 799 N A 0 13.9 380 6799 N A 0 11.7 105 N B 0 13.0 33.3 N B 0 12.7 105 N B 0 12.5 11.3 N< | N F 0 24.3 828 N F 0 24.3 828 N A 0 18.5 486 N A 0 18.5 250 N B 0 18.0 288 N B 0 19.0 6799 N F 0 19.0 6799 N F 0 19.0 333 N A 0 11.7 105 N B 0 13.0 333 N B 0 13.5 113 N B 0 13.5 185 N B 0 13.5 113 N F 0 13.5 113 | 8-09-77 | a | ı | 0 | 22.5 | 1140 | | | | | | | | | | | | 1140 | 0 |
| N F 0 24.3 N A 0 18.5 250 N A 0 18.5 250 N A 0 18.0 781 N B 0 18.0 781 N B 0 18.0 781 N B 0 18.0 788 N F 0 19.0 6799 N F 0 18.4 0 N A 0 13.9 380 N A 0 13.0 333 N B 0 13.0 333 N B 0 12.7 0 N F 0 13.3 143 N F <td>N F 0 24.3 N A 0 18.5 486 N A 0 18.5 250 N B 0 18.3 781 N B 0 18.0 288 N F 0 19.0 288 N F 0 13.9 380 N A 0 11.7 105 N B 0 13.0 333 N B 0 13.0 333 N B 0 13.0 333 N B 0 13.5 113 N F 0 13.5 113</td> <td>8-10-77</td> <td>z</td> <td>ш</td> <td>0</td> <td>24.3</td> <td>828</td> <td></td> <td>. 828</td> <td>0</td> | N F 0 24.3 N A 0 18.5 486 N A 0 18.5 250 N B 0 18.3 781 N B 0 18.0 288 N F 0 19.0 288 N F 0 13.9 380 N A 0 11.7 105 N B 0 13.0 333 N B 0 13.0 333 N B 0 13.0 333 N B 0 13.5 113 N F 0 13.5 113 | 8-10-77 | z | ш | 0 | 24.3 | 828 | | | | | | | | | | | | . 828 | 0 |
| N 18.5 486 250 | N | 8-10-77 | z | ıL | 0 | 24.3 | | | | | | | | | | | | | 0 | 0 |
| D A 0 18.5 250 N A 0 18.0 0 N B 0 18.3 781 1111 N B 0 18.3 781 1111 N B 0 18.0 6799 0 N F 0 18.4 0 17.7 105 N A 0 11.7 105 0 0 N A 0 11.7 105 0 0 N B 0 12.7 0 0 0 0 N B 0 13.3 185 0 | N | - 12 | ۵ | 4 | 0 | 18.5 | 486 | | | | | | | | | | | | 486 | 243 |
| N | N A 0 18.0 N B 0 18.3 781 N B 0 18.0 N F 0 19.0 6799 N F 0 13.9 380 N A 0 11.7 105 N A 0 11.7 105 N B 0 12.7 N C 13.3 185 N C 13.3 185 | - 12 | ٥ | ⋖ | 0 | 18.5 | 250 | | | | | | ٠. | | | | | | 250 | 0 |
| N A O 18.0 N B O 18.3 781 111 1111 1111 1111 | D B 0 18.3 781 N B 0 18.3 781 N B 0 18.0 111 N B 0 18.0 288 D F 0 19.0 288 N F 0 19.0 6799 N F 0 13.9 380 D A 0 13.9 380 N A 0 11.7 105 N B 0 13.0 333 N B 0 12.7 N B 0 12.7 N F 0 13.3 185 N F 0 12.5 113 | - 12 | z | ۷ | 0 | 18.0 | | | | | | | | | | | | | 0 | 0 |
| D B O 18.3 781 110 110 | D B 0 18.3 781 N B 0 18.0 111 N B 0 18.0 18.0 D F 0 19.0 6799 N F 0 18.4 18.4 N A 0 13.9 380 D A 0 11.7 105 D B 0 13.0 333 N B 0 12.7 N F 0 13.3 D F 0 13.3 N F 0 13.3 N F 0 13.3 N F 0 13.3 N F 0 12.5 N F 0 12.5 | - 12 | z | 4 | 0 | 18.0 | | | | | | | | | | | | | 0 | 0 |
| 111 | D B 0 18.3 111 N B 0 18.0 D F 0 19.0 288 N F 0 18.4 N F 0 13.9 380 D A 0 13.9 380 N A 0 11.7 105 D B 0 13.0 333 N B 0 12.7 N B 0 12.7 N B 0 12.5 113 | -12 | ٥ | 8 | 0 | | 781 | | | | | | | | | | | | 781 | 130 |
| N B 0 18.0 N R 0 18.0 N R 0 18.0 N R 0 19.0 288 N F 0 19.0 6799 N F 0 18.4 N R 0 11.7 105 N R 0 13.3 N R 0 13.7 105 N R 0 13.7 105 N R 0 13.7 105 N R 0 13.7 105 N R 0 13.7 105 N R 0 12.7 105 N R 105 | N B 0 18.0 N B 0 18.0 D F 0 19.0 288 N F 0 18.4 N F 0 13.9 380 D A 0 13.9 380 N A 0 11.7 105 N B 0 13.0 333 N B 0 12.7 N B 0 12.7 N B 0 13.3 185 N F 0 12.5 113 | - 12 | ٥ | 8 | 0 | | 111 | | | | | | | | | | | | == | 0 |
| 0 18.0 | D F 0 19.0 288 D F 0 19.0 6799 N F 0 18.4 D A 0 13.9 380 D A 0 11.7 105 D B 0 13.0 333 D B 0 13.1 333 D F 0 13.5 185 D F 0 12.5 113 | - 12 | z | 8 | 0 | | | | | | | | | | | | | | 0 | 0 |
| D F 0 19.0 288 6799 N F 0 18.4 6799 6799 N F 0 18.4 380 380 D A 0 13.9 380 380 N A 0 11.7 105 105 D B 0 11.7 105 105 N B 0 12.7 105 N B 0 12.7 133 D F 0 13.3 185 N F 0 13.3 113 N F 0 12.5 113 | D F 0 19.0 288 N F 0 18.4 6799 N F 0 18.4 380 D A 0 13.9 380 N A 0 11.7 105 N B 0 13.0 333 N B 0 12.7 N B 0 12.7 N B 0 12.7 N F 0 13.3 N F 0 12.5 N F 0 12.5 N F 0 12.5 | - 12 | z | 8 | 0 | | | | | | | | | | | | | | 0 | 0 |
| N F 0 19.0 6799 N F 0 18.4 N A 0 13.9 380 N A 0 11.7 0 N A 0 11.7 105 N B 0 13.0 333 N B 0 12.7 N B 0 13.3 N F 0 13.3 N F 0 13.3 N F 0 12.5 N F 0 12.5 | D F 0 19.0 6799 N F 0 18.4 N F 0 18.4 D A 0 13.9 380 N A 0 11.7 105 D B 0 13.0 333 N B 0 12.7 N B 0 12.7 N B 0 12.7 N F 0 12.5 113 | - 12 | 0 | ш | 0 | | 288 | | | | | | | | | | | | 288 | 0 |
| N F 0 18.4 N F 0 18.4 N F 0 13.9 380 D A 0 13.9 380 N A 0 11.7 105 N B 0 13.0 333 N B 0 12.7 N B 0 12.7 N B 0 12.7 N B 0 12.5 113 | N F 0 18.4 N F 0 18.4 N A 0 13.9 380 N A 0 11.7 105 N B 0 13.0 333 N B 0 12.7 N B 0 12.7 N F 0 12.5 113 | - 12 | ٥ | u. | 0 | | 6199 | | | | | | | | | | | | 6199 | 0 |
| N F O 18.4 N A O 13.9 380 N A O 11.7 105 N B O 13.0 333 N B O 12.7 N B O 13.3 185 D F O 13.3 185 N F O 12.5 113 | N F O 18.4 D A O 13.9 380 N A O 11.7 105 D B O 13.0 333 N B O 12.7 N B O 12.7 N F O 12.5 113 | - 12 | z | u. | 0 | | | | | | | | | | | | | | 0 | 0 |
| D A 0 13.9 380 N A 0 11.7 105 N A 0 11.7 105 D B 0 13.0 333 N B 0 12.7 N B 0 12.7 D F 0 13.3 N F 0 13.3 N F 0 13.3 N F 0 12.5 N F 0 12.5 | D A 0 13.9 380 N A 0 11.7 105 N B 0 13.0 333 N B 0 12.7 185 D F 0 13.3 185 N F 0 12.5 113 | - 12 | z | u. | 0 | | | | | | | | | | | | | | 0 | 0 |
| D A 0 13.9 N A 0 11.7 N A 0 11.7 N A 0 11.7 N B 0 13.0 N B 0 12.7 N B 0 12.7 N B 0 12.5 N F 0 12.5 N F 0 12.5 | D A 0 13.9 N A 0 11.7 N A 0 11.7 N B 0 13.0 D B 0 12.7 N B 0 12.7 D F 0 13.3 N F 0 12.5 N F 0 12.5 | 10-10-77 | 0 | ⋖ | 0 | 13.9 | 380 | | | | | | | | | | | | 380 | 0 |
| N A 0 11.7 105 N A 0 11.7 105 N B 0 13.0 333 N B 0 12.7 N B 0 12.7 N B 0 12.5 113 N F 0 12.5 113 | N A 0 11.7 105 N A 0 11.7 105 D B 0 13.0 333 N B 0 12.7 D F 0 13.3 185 D F 0 13.3 185 N F 0 12.5 113 | 10-10-77 | ٥ | ⋖ | 0 | 13.9 | | | | | | | | | | | | | 0 | 0 |
| N A 0 11.7 105 D B 0 13.0 D B 10 13.0 N B 0 12.7 N B 0 12.7 D F 0 13.3 185 D F 0 13.3 185 N F 0 12.5 113 N F 0 12.5 113 | N A O 11.7 105 D B O 13.0 D B O 12.7 N B O 12.7 D F O 13.3 185 D F O 13.3 185 N F O 12.5 113 | 10-10-77 | z | ⋖ | 0 | 11.7 | | | | | | | | | | | | | 0 | 0 |
| D B 0 13.0 333 333 333 333 333 333 333 333 333 | D B O 13.0 D B O 13.0 N B O 12.7 N B O 12.7 D F O 13.3 185 D F O 13.3 185 N F O 12.5 113 N F O 12.5 | 10-10-77 | z | ¥ | 0 | 11.7 | 105 | | | | | | | | | | | | 105 | 0 |
| D B 0 13.0 333 N B 0 12.7 N B 0 12.7 N B 0 12.7 N F 0 13.3 185 N F 0 12.5 113 N F 0 12.5 0 | D B O 13.0 333 N B O 12.7 N B O 12.7 N F O 13.3 185 N F O 12.5 113 N F O 12.5 | 10-10-77 | O | 8 | 0 | 13.0 | | | | | | | | | | | | | С | С |
| N B 0 12.7 N B 0 12.7 D F 0 13.3 185 D F 0 13.3 N F 0 12.5 113 N F 0 12.5 0 | N B O 12.7 N B O 12.7 D F O 13.3 185 D F O 13.3 N F O 12.5 113 | 10-10-77 | 0 | 8 | 0 | 13.0 | 333 | | | | | | | | | | | | 333 | 0 |
| N B 0 12.7 D F 0 13.3 185 D F 0 13.3 N F 0 12.5 113 N F 0 12.5 0 | N B O 12.7 D F O 13.3 185 D F O 13.3 N F O 12.5 113 N F O 12.5 | 10-10-77 | z | 8 | 0 | 12.7 | | | | | | | | | | | | | 0 | 0 |
| D F 0 13.3 185 185 0 D F 0 13.3 0 N F 0 12.5 113 113 N F 0 12.5 0 | D F O 13.3 185 D F O 13.3 185 N F O 12.5 113 N F O 12.5 | 10-10-77 | z | 8 | 0 | 12.7 | | | | | | | | | | | | | 0 | 0 |
| D F O 13.3 N F O 12.5 113 N F O 12.5 | D F O 13.3 N F O 12.5 113 N F O 12.5 | 10-10-77 | ٥ | ш | 0 | | 185 | | | | | | | | | | | | 185 | С |
| N F O 12.5 113 113 113 113 0 | N F O 12.5 113 | 10-10-77 | ٥ | ı. | 0 | | | | | | | | | | | | | | 0 | 0 |
| N F O 12.5 | N F O 12.5 | 10-10-77 | z | u. | 0 | 5 | 113 | | | | | | | | | | | | 113 | 0 |
| | | 10-10-77 | z | ı. | 0 | | | | | | | | | | | | | | 0 | 0 |

Appendix 10. Continued.

| Sample Parameters | | | | | Ī | Species/Groups | Group, | v | | | | | | |
|------------------------------|----------------|----|-----|----|----|----------------|--------|----|----|----|----|-------|-----------------|------|
| Te Date D1 Sta Dpt | emp C AL | SP | W S | γb | 45 | GP. | do | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| | | | | | | | | | | | | | 0 | (|
| D A 0 | | | | | | | | | | | | | 252 390 | 0 |
| D A O | න _් | | | | | | | | | | | | 0 | 0 |
| 11-08-77 N A O 11 | - · · · | | | | | | | | | | | | 0 | 0 |
| : | | | | | | | | | | | | | С | 0 |
| 0 8 0 1 | | | | | | | | | | | | | 0 | 0 |
| o 2 | 4. t | | | | | | | | | | - | | 0 | 0 |
| | . . | | | | | | | | | | | | 0 | 0 |
| | 0 | | | | | | | | | | | | 0 | 0 |
| | . o | | | | | | | | | | | | 0 (| 0 0 |
| 11-08-77 N F O 7 | 9.7 | | | | | | | | | | | | o c | o c |
| N F O | | | | | | | | | | | | | > | > |
| -17-77 D C O | 2.7 | | | | | | | | | | | | 0 (| 00 |
| 2 0 0 | 10.9 | | | | | | | | | | | | o c | o c |
| -17-77 D C 4 | 6.0 | | | | | | | | | | | | 0 | 0 |
| -17-77 D C 6 | 0.7 | | | | | | | | | | | | 0 | 0 |
| o d | æ. o | | | | | | | | | | | | 0 | 0 |
| -1/-// N C 2 -17-77 N C 4 | 0 80 | | | | | | | | | | | | 0 (| 0 0 |
| -17-77 N C 6 | 9.6 | | | | | | | | | | | | o | > |
| 0 0 0 12-71 | 2.2 | | | | | | | | | | | | 0 (| 00 |
| -17-77 0 0 2 | 9.6 | | | | | | | | | | | | > C | o c |
| -17-77 D D 4 | 9.6 | | | | | | | | | | | | o C | 0 |
| -17-77 D D 6 | 6.9 | | | | | | | | | | | | 0 | 0 |
| -17-77 D D 8 | e. 9 | | | | | | | | | | | | 0 | 0 |
| -17-77 N D O | 6.0 | | | | | | | | | | | | 0 | 0 |
| -17-77 N D 2 | 0.4 | | | | | | | | | | | | 0 | 0 |
| 4-17-77 N D 4 1 | 10.4 | | | | | | | | | | | | 0 | 0 |
| -17-77 N U 6 | 5. t | | | | | | | | | | | | 0 | 0 |
| -17-77 N D 8 | 4. | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

Appendix 10. Continued.

| | | | n - | | | | | | | • | 1 | | | | | | |
|---|-------------------|---------------------|--|----|----|-----|-----|----|---|----|----|----|---|----|-------|---|-------------------|
| Date D1 | Stal | 0pt | Temp | AL | SP | W S | d > | 41 | 9 | CP | BR | SS | S | FS | Misc. | Total Larvae | Eggs |
| 4 - 17 - 77 | 0 0 0 0 0 0 0 0 0 | 04400440 | £ 0.00 6.00 8.20 0.00 0.00 0.00 | | | | | | | | | | | | | 0000000 | 0000000 |
| 4 - 17 - 77 | IIIIIIII QQQQQQ | 0040000400 00400040 | | | | | | | | | | | | | | 000000000000000000000000000000000000000 | 000000000 0000000 |
| 5-18-77 D 5-18-77 D 5-18-77 D 5-18-77 D 5-19-77 N | 00000 | 00400 | 19.0 16.0 16.0 17.8 | 30 | | | | | | | | | | | | 00000 | 00000 |

Appendix 10. Continued.

| | | - | apperies/ ai oups | 2 | | | | | | |
|----|----------|----|-------------------|----|----|----|----|-------|-----------------|---------|
| AL | SP SM YP | d1 | JD CP | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| | | | | | | | | | 000 | 000 |
| | | | | | | | | | 000 | 000 |
| | | | | | | | | | 00000 | 00000 |
| | • | | | | | | | | 000 | ,000 |
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Appendix 10. Continued.

Appendix 10. Continued.

| | al ae Eggs | | 230 0 0 0 1050 0 532 0 | | 0 0 0 125 | 17 16 64 | 000000000000000000000000000000000000000 | 13 0 40 0 1295 0 311 0 0 0 30 0 |
|----------------|---------------|-------|---|--|------------------|---|--|--|
| | Total | 6 | 2 Om | • | , , | | | * |
| | Misc. | | | | | XP: 106 | | |
| | FS | | | | | | | |
| | NS | | | | | | | |
| | 88 | | | | | | | |
| S | BR | | | | | | | |
| /Group | CP | | | | | | | |
| Species/Groups | 9 | | | 18 | | | | |
| S | TP | | | | | | | |
| | γÞ | | 32 1050 532 | 1 | 94 | 370 42 54 | 14 35 11 | |
| | NS. | | | | | | | |
| | SP | | | | | | | |
| | AL | | 198 | 112 | 3 | 212 | 8 44 44 | 13 40 1295 311 30 52 |
| ຮ | Temp C | 6.7 | 17.5 17.0 16.0 15.0 | | | 16.0 16.0 16.2 16.2 | 4 1010101010144 | 221.7 221.0 221.0 221.0 19.6 19.6 |
| Parameter | Dpt | 0 6 4 | 10807 | 4 0 8 | 0 7 4 | 0004 | 0 8 4 0 0 8 4 6 | 00400040 |
| Para | Sta | | CIIII | | | | | |
| Sample | 10 | | 00022 | | | 00222 | | |
| Sam | Date | -16- | 6 - 16 - 77 6 - 16 - 77 6 - 16 - 77 6 - 15 - 77 6 - 15 - 77 | - - 1 5 - - 1 5 - - 1 5 | - 15-7 - 15-7 | 6-15-77 6-15-77 6-16-77 6-16-77 6-16-77 | 7 - 16 - 7 - 14 - 7 - 14 - 7 - 14 - 7 - 15 - 7 | - 12 - 12 - 12 - 12 - 12 - 12 - 12 - 12 |

Appendix 10. Continued.

| Date Di Sta Dpt C Date Di Sta Dpt C Date Di Sta Dpt C Date Di Sta Dpt C Date Di Sta Dpt C Date Di Sta Dpt C Date Di Sta Dpt C Date Di Sta Dpt C Date Di Sta Dpt C Date Di Sta Dpt C Date Di Sta Dpt C Date Di Sta Dpt C Date Di Sta Dpt C Date Di Sta Dpt C Date Di Sta Dpt | Sample | e e | arameter | eters | | | | | ţ | Species/Groups | /Group | SC | | | | | |
|--|--------|-----|----------|----------|----------|----|------------|----|-----|----------------|--------|----|----|----|---|------------------|---------------|
| 12-77 D D C 22.3 72 112-77 D D C 22.2 2659 113 2672 112-77 D D E 20.2 2659 113 2672 112-77 D D E 6 20.2 2659 113 2672 112-77 D D E 6 20.2 2659 113 2672 112-77 D D E 6 20.2 2659 114 6 19.6 60 115 7 D E 6 21.0 66 115 7 D E 6 21.0 66 115 7 D E 70 11.8 7 115 7 D E 70 11 | ate | s - | a D | + | ◀ | SP | ₩ S | γP | 1.6 | 9 | CP | BR | SS | NS | s | Tota | 99 |
| 1077 1 0 0 2 20 2 20 1 0 1 2 20 2 20 2 2 | - 12- | | | , | | | | | | | | | | | | 1 2 | |
| 12-77 0 0 6 20.2 2559 13 2572 12-77 0 0 6 20.2 2559 13 2572 12-77 0 0 6 19.6 60 60 60 60 60 60 60 60 60 60 60 60 60 | - 12- | | | 20. | 2 | | | | | | | | | | | 1072 | o c |
| 12-77 D D B 6 19.2 350 27-77 N D D B 6 19.6 50 27-77 N D D B 19.6 50 27-77 N D D B 19.6 50 27-77 N D D B 19.6 50 27-77 N D D B 19.6 50 27-77 N D D B 19.6 50 27-77 N D D B 19.6 50 27-77 N D D B 19.6 50 27-77 N D D B 19.7 15 28-77 N D D D B 19.7 15 28-77 N D D D B 19.7 15 28-77 N D D D B 19.6 50 28-77 N D D D B 19.7 15 28-77 N D D D D B 19.7 15 28-77 N D D D D D D D D D D D D D D D D D D | -12- | | | 20. | 25 | | | | | 13 | | | | | | 2572 | 0 |
| 12-77 N D 0 19.2 350 27-77 N D 0 19.6 60 27-77 N D 19.6 60 28-77 N D 19.7 15 12-77 D E 10.4 34 28-77 N E 0 1.8 28-77 N E 0 1.9 12-77 N G | -12- | | | 20. | | | | | | | | | | | | 72 | 0 |
| 27-77 N D D 1916 G0 27-77 N D D 1916 G0 27-77 N D D 4 1916 G0 27-77 N D D 4 1916 G0 27-77 N D D 4 1916 G0 27-77 N D D 6 1916 G0 27-77 N D E 14 1917 15 15 15 15 15 15 15 15 15 15 15 15 15 | -12- | | | 19 | m | | | | | | | | | | | 350 | 0 |
| 27777 N D 2 19.6 60 27777 N D 6 19.6 27777 N D 6 19.6 27777 N D 6 19.6 27777 N D 6 19.6 2777 N D 6 19.6 2877 N E 8 19.7 2877 N E 14 11.8 2877 N E 14 11.8 2877 N E 14 11.8 2877 N E 14 11.8 2877 N E 14 11.8 2877 N E 14 11.8 2877 N E 14 11.8 2877 N E 14 11.8 2877 N E 14 11.8 2877 N E 14 11.8 2877 N E 14 11.8 2877 N E 14 11.8 2877 N E 14 11.8 2877 N G 1 2 1.2 2877 N G 2 2 1.2 2877 N G 2 2 2 2 3 2877 N G 2 2 2 3 2877 N G 2 2 2 3 2877 N G 3 2 3 2 4 2877 N G 4 19.6 2878 N G 2 2 0.3 2877 N G 1 19.6 2878 N G 2 19.6 2878 N G 2 19.6 2878 N G 2 19.6 2878 N G 2 19.6 2878 N G 2 2 19.6 2878 N G 2 19.6 2877 N G 2 19.6 2878 N G 2 19.6 2877 N G 2 19.6 2878 N G 2 19.6 2877 N G 2 19.6 2878 N G 2 19.6 2877 N G 2 19.6 2878 N G 2 19.6 2877 N G 2 19.6 2877 N G 2 19.6 2877 N G 2 19.6 2877 N G 2 19.6 2877 N G 2 19.6 2877 N G 2 19.6 2877 N G 2 19.6 2878 N G 2 19.6 2878 N G 2 19.6 2878 N G 2 19.6 2878 N G 2 19.6 2877 N G 2 19.6 2878 N G 2 1 | -21- | | | 19 | | | | | | | | | | | | 30 | 0 |
| 227-77 N D 6 19.6 27-77 N D 6 19.6 28-77 N E 14 19.7 28-77 N E 14 11.8 28-77 N E 14 11.8 28-77 N E 2 21.2 28-77 N G 2 19.6 29-77 N G 2 19.6 29-77 N G 6 19.6 29-77 N G 6 19.6 29-77 N G 7 19.6 29-77 N G 7 19.6 29-77 N G 7 19.6 29-77 N G 7 19.6 29-77 N G 8 19.6 29-77 N G 9 19.6 29-77 N G 9 19.6 29-77 N H 0 19.6 29 | -27- | | | 6. | | | | | | | | | | | | 09 | 0 |
| -12-77 N D 8 19.6 -12-77 N D 8 19.6 -12-77 D E 10 21.0 -12-77 D E 10 19.7 -12-77 D E 10 19.7 -12-77 D E 10 19.7 -12-77 D E 10 19.6 -12-77 D E 10 19.6 -12-77 D G 2 21.2 -12-77 D G 2 21.2 -12-77 D G 2 21.2 -12-77 D G 2 21.2 -12-77 D G 2 21.2 -12-77 D G 2 21.3 -12-77 | -27- | | | <u>.</u> | . | | | | | | | | | | | 0 | 0 |
| -27-77 D E 9 19.0 -12-77 D E 8 19.7 -12-77 D E 8 19.7 -12-77 D E 9 11.8 -28-77 N E 8 11.8 -28-77 N E 9 11.8 -28-77 N E 9 11.8 -28-77 N E 9 11.8 -28-77 N G 0 21.9 -12-77 D G 0 21.9 -12-77 D G 0 21.9 -12-77 D G 0 21.9 -12-77 D G 0 21.9 -12-77 D G 0 21.9 -12-77 D G 0 21.9 -12-77 D G 0 21.9 -12-77 D G 0 21.9 -12-77 D G 0 21.9 -12-77 D H 0 21.8 -13-8 D H 0 21.8 -13- | -12- | | | 0. 0 | | | | | | | | | | | | 0 | 0 |
| 12-77 D E 10 10 10 10 10 10 10 10 10 10 10 10 10 | -17- | | | 6 | • | | | | | | | | | | | 0 | 0 |
| 12-77 D E 8 19.7 15 15 15 15 15 15 15 15 15 15 15 15 15 | -12- | | | 21. | ~ | | | | | | | | | | | С | С |
| 12-77 D E 14 19 7 15 45 46 45 46 8 | -12- | | | 19. | | | | 15 | | | | | | | | . . . | C |
| 12-77 D E 20 16.4 34 34 34 34 34 34 34 34 34 34 34 34 34 | -12- | | | 19. | - | | | | | | | | | | | 15 | 0 |
| 28-77 N E 0 11.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | -12- | | | 16. | က | | | | | | | | | | | 34 | 0 |
| 28-77 N E 18 11.8 -28-77 N E 20 11.8 -28-77 N E 20 11.8 -12-77 D G 2 21.2 | -28- | | | = | - | | | | | | | | | | | 0 | 0 |
| 28-77 N E 14 11.8 -28-77 N E 20 11.8 -12-77 D G 0 21.9 -12-77 D G 4 21.2 -12-77 D G 4 21.2 -12-77 D G 6 21.3 -12-77 D G 6 21.3 -12-77 N G 2 19.6 -27-77 N G 4 19.6 -27-77 N G 6 19.6 -27-77 N G 7 19.6 -27-77 N G 7 19.6 -27-77 N G 7 19.6 -27-77 N G 7 19.6 -27-77 N G 7 19.6 -27-77 N G 7 19.6 -27-77 N H 7 19.6 -27-77 N H 8 17.4 -27-77 N H 8 19.6 -27-77 N H 8 19.6 -27-77 N H 8 19.6 | -28- | | | = | _ | | | | | | | | | | | 0 | 0 |
| 28-77 N E 20 11.8 12-77 D G 0 21.9 12-77 D G 0 21.9 12-77 D G 0 21.9 14-77 D G 6 21.2 15-77 D G 6 21.2 15-77 N G 0 19.6 15-77 N G 0 19.6 15-77 N G 0 19.6 15-77 N G 0 19.6 16-77 N G 0 19.6 17-77 N G 0 19.6 180 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 112-77 D H 0 21.8 1139 12-77 D H 8 17.4 139 139 12-77 N H 2 19.6 12-77 N H 6 19.6 | -28- | | | = | - | | | | | | | | | | | 0 | 0 |
| 112-77 D G O 21.9 | -28- | | | = | | | | | | | | | | | | 0 | 0 |
| 12-77 D G G 2 21:2 16 12-77 D G G 2 21:2 16 12-77 D G G 2 21:2 16 12-77 D G G 2 21:2 678 155 12-77 N G G 19:6 62 27-77 D H O 21:8 12-77 D H O 21:8 12-77 D H G 20:3 241 12-77 D H G 20:3 54 12-77 D H G 20:3 54 12-77 D H G 19:6 12-77 N H G 19:6 12-77 N H G 19:6 12-77 N H G 19:6 12-77 N H G 19:6 12-77 N H G 19:6 12-77 N H G 19:6 12-77 N H G 19:6 12-77 N H G 19:6 12-77 N H G 19:6 12-77 N H G 19:6 12-77 N H G 19:6 | 1 2 2 | | | Ċ | - | | | | | | | | | | | (| (|
| 16 | 77 | | | | • | | | | | | | | | | |) |) |
| 12-77 N G 0 19.6 52 -27-77 N G 0 19.6 62 -27-77 N G 0 19.6 62 -12-77 N G 0 19.6 180 -12-77 D H 0 21.8 241 -12-77 D H 2 20.3 241 -12-77 D H 2 20.3 1608 -12-77 D H 2 20.3 54 -12-77 D H 2 20.3 54 -12-77 D H 2 20.3 64 -12-77 N H 2 19.6 0 -27-77 N H 2 19.6 0 -27-77 N H 6 19.6 0 | 771 | | | 5 6 | - 5 | | | | | | | | | | | 91.0 | 0 (|
| 127 | 7 6 | | | | 10 | | | | | | | | | | | 8/9 | 0 (|
| -27-77 N G 2 19.6 62 -27-77 N G 4 19.6 33 -27-77 N G 4 19.6 33 -27-77 N G 4 19.6 33 -27-77 N G 6 19.6 180 -12-77 D H 0 21.8 -12-77 D H 2 20.3 241 -12-77 D H 4 20.3 1608 -12-77 D H 6 20.3 54 -12-77 D H 8 17.4 139 -27-77 N H 0 19.6 -27-77 N H 2 19.6 0 -27-77 N H 6 19.6 0 -27-77 N H 8 19.6 | -27- | | | - 6 | ייים | | | | | | | | | | | | o c |
| -27-77 N G 4 19.6 33 -27-77 N G 6 19.6 180 12-77 N G 6 19.6 180 12-77 D H 0 21.8 1608 -12-77 D H 4 20.3 1608 -12-77 D H 4 20.3 1608 -12-77 D H 6 20.3 54 -12-77 D H 6 20.3 54 -12-77 D H 8 17.4 139 -12-77 N H 0 19.6 -27-77 N H 2 19.6 -27-77 N H 6 19.6 | -27- | | | 5 | 9 | | | | | | | | | | | 62 | 0 |
| 127-77 N G G 19.6 180 127-77 N G G 19.6 180 127-77 D H 0 21.8 12-77 D H 2 20.3 241 1608 12-77 D H 4 20.3 1608 12-77 D H 6 20.3 54 139 139 139 139 139 139 139 13 | -27- | | | 6 | , e | | | | | | | | | | | V C | > C |
| -12-77 D H O 21.8 241 1608 1608 1608 1608 1608 1541 12-77 D H 4 20.3 1608 1608 1541 139 139 139 139 139 139 139 139 139 13 | -27- | | | 19. | 18 | | | | | | | | | | | 180 | 0 |
| -12-77 D H 2 20.3 241 -12-77 D H 4 20.3 1608 -12-77 D H 6 20.3 54 -12-77 D H 6 20.3 54 -12-77 D H 8 17.4 139 -27-77 N H 0 19.6 -27-77 N H 2 19.6 0 -27-77 N H 6 19.6 0 -27-77 N H 6 19.6 | - 12-7 | | | 21 | | | | | | | | | | | | c | c |
| 12-77 D H 4 20.3 1608 -12-77 D H 6 20.3 54 -12-77 D H 8 17.4 139 -27-77 N H 2 19.6 -27-77 N H 4 19.6 -27-77 N H 6 19.6 -27-77 N H 6 19.6 | -12-7 | | | 20 | 0 | | | | | | | | | | | 244 | > < |
| -12-77 D H 6 20.3 54 -12-77 D H 8 17.4 139 -27-77 N H 0 19.6 -27-77 N H 2 19.6 -27-77 N H 4 19.6 -27-77 N H 6 19.6 -27-77 N H 8 19.6 | -12-7 | | | 000 | 1 9 | | | | | | | | | | | 1508 | 0 |
| -12-77 D H 8 17.4 139 139 139 139 139 139 139 139 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | -12-7 | | | 20. | | | | | | | | | | | | 25. | o c |
| -27-77 N H O 19.6 -27-77 N H 2 19.6 -27-77 N H 4 19.6 -27-77 N H 6 19.6 -27-77 N H 8 19.6 | -12-7 | | | 17. | _ | | | | | | | | | | | 139 | 0 |
| -27-77 N H 2 19.6 -27-77 N H 4 19.6 -27-77 N H 6 19.6 -27-77 N H 8 19.6 | -27-7 | | | 19. | | | | | | | | | | | | 0 | 0 |
| -27-77 N H 4 19.6 0 -27-77 N H 6 19.6 0 -27-77 N H 8 19.6 0 | -27-7 | | | 19. | | | | | | | | | | | | 0 | 0 |
| -27-77 N H 6 19.6 0 | -27-7 | | | 19 | | | | | | | | | | | | 0 | 0 |
| -27-77 N H 8 19.6 | -27-7 | | | 19. | | | | | | | | | | | | 0 | 0 |
| | -27-7 | | | 19. | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | | | | |

Appendix 10. Continued.

| ate DI Sta Dpt Temp AL SP SM VP TP UD CP BR SS NS FS Misc. Larvage E0gs 12-77 D R 2 20.3 15 15 15 16 30 3 | D1 Sta Dpt C C C C C C C C C C C C C C C C C C C | | Σ ω | F | 9 | CP | % M | SS | X X X X Y | 10 tarve 83 33 33 33 33 33 33 33 33 33 33 33 33 | Eggs 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
|--|--|---|-----|---|---|----|-----|----|------------------|--|--|
| 7 D R 0 20.7 15 15 15 208 825 7 1040 825 7 1081 82 20.3 1021 20.3 | 7 D R 0 20.7 7 D R 6 20.3 7 D R 6 20.3 7 N R 6 20.3 7 N R 7 D 19.6 7 N R 7 19.6 6 6 7 7 N W 14 19.8 7 D W 20 12.3 7 D W 20 12.7 7 N W 14 19.8 7 T D C 0 19.4 7 D C 2 19.4 7 D C 2 19.4 7 D C 2 19.4 7 D C 6 19.4 7 D C 6 19.4 7 D C 6 19.4 | | | | | | | | - | 2, 8, 0, 0, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, | 46 |
| 7 D R R 0 20.7 15 15 15 15 15 15 15 15 15 15 15 15 15 | 7 D R 0 20.7 7 D R 2 20.3 7 T D R 6 20.3 7 N R 6 19.6 7 N R 7 19.6 7 N R 6 19.6 7 N R 6 19.6 7 D W 0 21.3 7 D W 19.8 7 T D W 14 19.8 7 N W 20 12.7 7 N W 14 11.8 7 N W 20 12.7 7 D C 2 19.4 7 D C 2 19.4 7 D C 6 19.4 7 D C 6 19.4 7 D C 6 19.4 7 D C 6 19.4 | | | | | | | | | 9 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 46 |
| 7 D R 2 20.3 8208 7 D R 6 20.3 1021 7 D R 6 20.3 1021 7 N R 6 19.6 97 7 N R 6 19.6 97 7 N R 6 19.6 97 7 N R 6 19.6 97 7 N R 7 19.6 97 7 N W 8 19.8 14 7 N W 8 11.8 78 7 N W 8 11.8 78 7 N W 8 11.8 78 7 N W 8 11.8 78 7 N W 8 11.8 78 7 N W 8 11.8 78 7 N W 8 11.8 78 7 N W 8 11.8 78 7 N W 8 11.8 78 7 N W 8 11.8 78 7 N W 8 11.8 78 7 N W 8 11.8 78 7 N W 9 11.8 78 7 N W 9 11.8 78 7 N W 9 11.8 78 7 N W 9 11.8 78 7 N W 9 11.8 78 7 N W 9 11.8 78 7 N W 9 11.8 78 7 N W 9 11.8 78 7 N W 9 11.8 78 7 N W 0 2 2.13 2.25 3.25 7 N W 0 2 2.15 3.25 3.25 7 N M 0 0 22.5 3.25 7 N M 0 0 | 7 D R 2 20.3 7 D R 6 20.3 7 N R 7 0 19.6 7 N R 7 0 19.6 7 N R 6 19.6 7 N R 6 19.6 7 D W 8 19.8 7 D W 14 19.8 7 N W 0 11.8 7 N W 14 11.8 7 D C 2 19.4 7 D C 2 19.4 7 D C 6 19.4 7 D C 6 19.4 7 D C 6 19.4 7 D C 6 19.4 | | | | | | | | • | <u> </u> | 46 |
| 7 D R 4 20.3 1021 7 N R 7 0 19.6 36 7 N R 8 0 19.6 36 7 N R 8 0 19.6 36 7 N R 8 0 19.6 36 7 N R 8 0 19.6 36 7 N R 8 19.6 36 7 N R 8 19.6 36 7 N R 8 19.8 14 7 D W 0 21.3 7 D W 0 21.3 7 D W 0 21.3 7 D W 0 21.3 7 D W 0 21.3 7 D W 0 21.3 7 D W 0 21.3 7 D W 0 21.3 7 D W 0 21.3 7 D W 0 21.3 7 D W 0 21.3 7 D W 0 21.3 7 D W 0 21.3 7 D C 0 19.4 342 7 D C 0 19.4 36 7 D C 0 21.5 34 7 D C 0 21.5 34 7 D C 0 21.5 34 7 D C 0 21.5 34 7 D D D C 21.5 34 7 D D D D C 21.5 34 7 D D D D C 21.5 34 7 D D D D C 21.5 34 7 D D D D C 21.5 34 7 D D D D C 21.5 34 7 D D D D D D D D D D D D D D D D D D D | 7 D R 4 20.3 B 8 7 7 N R 6 20.3 10 6 6 7 N R 6 20.3 10 6 7 N R 6 19.6 6 7 N R 6 19.6 6 7 N R 6 19.6 6 7 N W 14 19.8 8 11.8 17 N W 20 11.8 11.8 17 D C 2 19.4 11.8 17 D C 2 19.4 11.8 17 D C 6 19.4 11.8 11.8 11.8 11.8 11.8 11.8 11.8 11 | | | | | | | | - | Q W W W | 86 4 6 |
| 7 N R 6 20.3 1021 7 N R 2 19.6 397 7 N R 2 19.6 397 7 N R 2 19.6 397 7 N R 6 19.6 357 7 N R 6 19.6 530 7 N R 8 19.8 14 7 D W 0 21.3 7 D W 0 21.3 7 N W 14 11.8 78 7 N W 18 11.8 78 7 N W 18 11.8 78 7 N W 20 21.5 34 7 N W 20 21.5 34 7 N W 20 22.0 240 7 | 7 N R 6 20.3 10 7 N R 2 19.6 7 N R 6 19.6 7 N R 6 19.6 7 D W 8 19.8 7 D W 14 19.8 7 D W 20 12.7 7 N W 8 11.8 7 N W 14 11.8 7 N W 20 11.8 7 N W 14 11.8 7 N W 6 11.8 7 N W 6 11.8 7 N W 7 0 11.8 7 N W 6 19.4 7 D C 2 19.4 7 D C 6 19.4 | | | | | | | | | , | 46 |
| 7 N R 2 19.6 35 7 N R 2 19.6 630 7 N R 4 19.6 630 7 N R 6 19.6 630 7 D W 0 21.3 14 7 D W 14 19.8 14 7 N W 12 12.7 78 7 N W 14 11.8 78 7 N W 20 11.8 78 7 N W 20 11.8 78 7 N W 20 11.8 78 7 N W 20 11.8 78 7 N W 20 11.8 78 7 N W 20 11.8 78 7 N W 20 11.8 78 8 19.4 14.6 78 7 N C 2 19.4 13.6 13.6 13.6 13.6 13.6 13.6 13.6 13.6 | 7 N R 0 19.6 7 N R 2 19.6 7 N R 2 19.6 7 N R 4 19.6 6 19.6 7 D W 8 19.8 7 D W 14 19.8 7 D W 20 12.7 7 N W 14 19.8 7 N W 20 12.7 7 N W 14 11.8 7 N W 14 11.8 7 N C 0 19.4 3 17 D C 0 19.4 3 17 D C 0 19.4 6 19.4 | | | | | | | | | 630 357 0 0 0 0 0 0 0 | 4 |
| 7 N R 2 19.6 637 7 N R 6 19.6 357 7 N R 6 19.6 357 7 N R 6 19.6 357 7 D W 0 21.3 7 D W 0 21.3 7 D W 8 11.8 7 D W 14 19.8 7 N W 14 19.8 7 N W 14 11.8 7 N W 14 11.8 7 N W 14 11.8 7 N W 20 11.8 7 N W 20 11.8 7 N W 20 11.8 7 N W 20 11.8 7 N W 20 11.8 7 N W 20 11.8 7 N W 20 11.8 7 N C 0 23.2 7 D C 0 19.4 57 7 N C 0 23.2 7 D C 0 19.4 657 7 N C 0 23.2 7 D C 0 19.4 757 7 N C 0 23.2 7 D C 0 19.4 857 7 N C 0 23.2 7 D C 0 19.4 857 7 N C 0 22.5 7 N C 0 22 | 7 N R 2 19.6 7 N R 4 19.6 7 N R 6 19.6 7 D W 8 19.8 7 D W 14 19.8 7 D W 20 12.7 7 N W 8 11.8 7 N W 14 11.8 7 N W 20 12.7 7 D C 2 19.4 7 D C 2 19.4 7 D C 6 19.4 7 D C 6 19.4 7 D C 6 19.4 | | | | | | | | | 630 357 0 0 0 0 78 | 34 |
| 7 N R 4 19.6 630 7 N R 6 19.6 357 7 N R 7 19.6 630 7 D W 8 19.8 14 7 D W 8 0 21.3 14 7 D W 8 0 11.8 78 7 N W 14 19.8 78 7 N W 14 11.8 78 7 N W 14 11.8 78 7 N W 14 11.8 78 7 N W 15 11.8 78 7 N W 15 11.8 78 7 N W 20 11.8 78 7 N W 20 11.8 78 7 N W 20 11.8 78 7 N W 20 11.8 78 7 N W 20 11.8 78 7 N W 20 11.8 78 7 N C 0 23.2 512 7 N C 0 23.2 512 7 N C 0 23.2 512 7 N C 0 23.2 512 7 N C 0 23.2 512 7 N C 0 23.2 512 7 N C 0 23.2 512 7 N C 0 23.2 512 7 N C 0 23.2 512 7 N C 0 23.2 512 7 N C 0 23.2 512 7 N C 0 23.2 512 7 N C 0 23.2 512 7 N C 0 23.2 513 7 N C 0 22.5 34 7 N C 0 22.5 34 7 N C 0 22.5 53 7 N D D 0 22.5 53 7 N D 0 22. | 7 N R 4 19.6 6 7 N R 6 19.6 7 O W 8 19.8 7 O W 20 12.3 7 N W 14 19.8 7 N W 14 11.8 7 N W 20 11.8 7 N W 20 11.8 7 O C 2 19.4 3 7 O C 6 19.4 3 7 O C 6 19.4 3 7 O C 6 19.4 3 7 O C 6 19.4 3 7 O C 6 19.4 3 7 O C 6 19.4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | | | | | | | | | 357 0 0 0 0 78 0 | |
| 7 D W 8 19.8 14 7 D W 8 19.8 14 7 D W 8 19.8 14 7 D W 8 19.8 14 7 D W 8 19.8 78 7 N W 14 19.8 78 7 N W 15 11.8 78 7 N W 15 11.8 78 7 N W 16 11.8 78 7 N W 17 N W 17 N W 18 11.8 78 7 N W 18 11.8 78 7 N W 18 11.8 78 7 N W 18 11.8 78 7 N W 18 11.8 78 7 D C C 19.4 157 7 D C C 19.4 156 7 N C C 2 19.4 156 7 N C C 2 19.5 15 7 N C C 2 19.5 15 7 N C C 2 11.5 15 7 N C C C 2 11.5 15 7 N C C C 2 11.5 15 7 N C C C 2 11.5 15 7 N C C C C C C C C C C C C C C C C C C | 7 D W 0 21.3 7 D W 8 19.8 7 D W 14 19.8 7 D W 20 12.7 7 N W 16 11.8 7 N W 20 11.8 7 D C 0 19.4 7 D C 2 19.4 7 D C 6 19.4 7 D C 6 19.4 | | | | | | | | | 041000800 | 0000000 |
| 7 D W 0 21.3 | 7 D W 8 19.8 7 D W 14 19.8 7 D W 14 19.8 7 N W 20 12.7 7 N W 14 11.8 7 N W 20 11.8 7 N W 20 11.8 7 D C 0 19.4 7 D C 2 19.4 7 D C 6 19.4 7 D C 6 19.4 | | | | | | | | | 0 1 1 0 0 0 8 0 0 | 0000000 |
| 7 D W 8 19.8 14 7 D W 14 19.8 7 N W 20 11.8 7 N W 14 11.8 78 7 N W 15 11.8 78 7 N W 15 11.8 78 7 N W 16 11.8 78 7 N W 16 11.8 78 7 N W 17 N W 18 11.8 78 7 N W 18 11.8 78 7 N W 18 11.8 78 7 N W 18 11.8 78 7 D C Q 19.4 156 7 D C Q 21.5 312 7 N C Q 21.5 85 | 7 D W 19.8 7 D W 14 19.8 7 N W 20 12.7 7 N W 19.18 7 N W 14 11.8 7 N W 20 11.8 7 D C 0 19.4 7 D C 2 19.4 7 D C 6 19.4 7 D C 6 19.4 | | | | | | | | | 4000800 | 000000 |
| 7 D W 14 19.8 7 N W 20 12.7 7 N W 8 11.8 7 N W 20 12.7 7 N W 14 11.8 7 N W 20 12.7 7 N W 20 11.8 7 N W 20 11.8 7 N W 20 11.8 7 N W 20 11.8 7 N W 20 11.8 7 N W 20 11.8 7 N W 20 11.8 7 N C 2 219.4 146 7 N C 0 23.2 32.2 7 N C 0 23.2 32.2 7 N C 0 2 21.9 32.1 7 N C 0 2 21.9 32.1 7 N C 0 2 21.5 150 7 N C 0 2 2.5 34 7 N D 0 2 2.5 33 7 | 7 D W 14 19:08 7 N W 20 12:7 7 N W 20 12:7 7 N W 14 19:08 7 N W 20 12:7 7 D C 19:4 7 D C 2 19:4 7 D C 6 19:4 7 D C 6 19:4 7 D C 6 19:4 7 D C 6 19:4 | | | | | | | | | 000800 | 00000 |
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| 7 N W | 7 N W 0 11.8 7 N W 14 11.8 7 N W 14 11.8 7 D C 0 19.4 7 D C 2 19.4 7 D C 6 19.4 7 D C 6 19.4 | | | | | | | | | 0 7 0 0 | 0000 |
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| 7 N W 20 11.8 7 N W 20 11.8 7 N W 20 11.8 7 N W 20 11.8 7 T D C C 19.4 57 17 D C C 19.4 146 17 D C C 19.4 136 17 N C C 2 21.9 321 77 N C C 2 21.9 75 77 N C C 2 21.5 150 77 D D C 2 1.5 150 77 D D C 2 21.5 34 77 D D C 2 21.5 34 77 D D C C 2 21.5 34 77 D D C C 2 21.5 34 77 D D C C 2 21.5 34 77 D D C C 2 21.5 34 77 D D C C 2 21.5 34 78 D D C 2 21.5 34 79 D D C 2 21.5 34 70 D D C 2 21.5 34 71 N D C 2 22.0 210 72 N D C 2 22.0 220 73 N D C 2 22.0 220 74 N D C 2 22.0 250 75 N D C 2 22.0 250 76 N D C 2 22.0 250 77 N D C 2 22.0 250 78 N D C 2 22.0 250 78 N D C 2 22.0 250 78 N D C 2 22.0 250 78 N D C 2 22.0 250 78 N D C 2 22.0 250 78 N D C 2 22.0 250 | 77 N W 20 11.8 | | | | | | | | | С | 0 |
| 342 77 D C 0 19.4 342 77 D C 2 19.4 146 77 D C 6 19.4 136 77 D C 6 19.4 136 77 N C 0 23.2 512 77 N C 0 23.2 512 77 N C 0 21.5 150 77 D D 0 21.5 85 77 D D 0 21.5 93 77 N D 0 2 22.5 93 77 N D 0 2 22.0 210 78 D D 6 21.5 93 77 N D 0 2 22.0 210 78 D D 6 21.5 29 78 D D 6 21.5 29 79 D D 6 21.5 29 70 D D 6 21.5 29 71 N D 0 2 22.0 210 72 N D 0 2 22.0 210 73 N D 0 2 22.0 210 | 77 D C 0 19.4 3 77 D C 2 19.4 3 77 D C 2 19.4 17 D C 6 19.4 17 N C 0 23.2 5 | | | | | | | | | , | |
| 77 D C 0 19.4 342 77 D C 2 19.4 146 77 D C 6 19.4 136 77 D C 6 19.4 136 77 N C 0 23.2 512 77 N C 0 23.2 321 77 N C 6 21.9 75 77 N C 6 21.5 85 77 D D 0 21.5 85 77 D D 0 21.5 85 77 D D 0 21.5 29 77 D D 6 21.5 29 77 N D 0 22.5 93 77 N D 0 22.5 93 | 77 D C 0 19.4 3 77 D C 2 19.4 77 D C 4 19.4 77 D C 6 19.4 77 N C 0 23.2 | | | | | | | | | 342 | C |
| 7 D C 2 19.4 57 7 D C 4 19.4 146 136 136 17 D C 6 19.4 146 136 17 D C 6 19.4 146 17 N C 2 21.9 321 17 N C 2 21.9 321 17 N C 4 21.9 75 17 N C 6 21.5 150 17 N C 6 21.5 85 17 D D 2 21.5 34 17 D D 0 2 21.5 34 17 D D 0 2 21.5 34 17 D D 0 2 21.5 34 17 D D 0 2 21.5 34 17 D D 0 2 21.5 34 17 D D 0 2 21.5 34 17 D D 0 2 21.5 34 17 D D 0 2 21.5 34 17 D D 0 2 21.5 53 17 N D 0 0 22.5 93 17 N D 0 0 22.5 93 17 N D 0 0 22.5 22.0 210 17 N D 0 0 22.5 22.0 210 17 N D 0 0 22.5 22.0 210 17 N D 0 0 22.5 22.0 210 | 77 D C 2 19.4 77 D C 4 19.4 17 D C 6 19.4 17 N C 0 23.2 | | | | | | | | | 57 | o C |
| 77 D C 4 19.4 146 77 D C 6 19.4 136 77 N C 0 23.2 5512 77 N C 2 21.9 75 77 N C 6 21.5 150 77 N C 6 21.5 150 77 N C 6 21.5 29 77 D D 0 2 21.5 34 77 D D 0 2 21.5 34 77 D D 0 4 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 21.5 59 77 N D 0 8 22.0 210 | 77 D C 4 19.4 17 N C 0 23.2 5 | | | | | | | | | 974 | C |
| 77 D C 6 19.4 136 77 N C 0 23.2 512 77 N C 0 23.2 512 77 N C 4 21.9 75 77 N C 4 21.5 150 77 D D 0 21.5 85 77 D D 0 2 21.5 34 77 D D 0 2 21.5 34 77 D D 0 2 21.5 34 77 D D 0 2 21.5 39 77 D D 0 2 21.5 93 77 N D 0 2 2.5 93 77 N D 0 2 2.5 93 77 N D 0 2 2.5 93 77 N D 0 2 2.5 93 77 N D 0 2 2.5 93 77 N D 0 2 2.5 0 240 77 N D 0 2 2.5 0 25 77 N D 0 2 2.5 0 25 | 77 D C 6 19.4 1 | | | | | | | | | 136 | C |
| 77 N C 0 23.2 512 77 N C 2 21.9 321 77 N C 4 21.9 75 77 N C 4 21.9 75 77 N C 6 21.5 150 77 D D 0 21.5 85 77 D D 0 2 21.5 29 77 D D 6 21.5 29 77 D D 6 21.5 29 77 D D 6 21.5 93 77 N D 0 22.5 93 77 N D 0 22.5 93 77 N D 0 22.5 250 78 N D 2 22.0 210 78 N D 2 22.0 210 | 77 N C O 23.2 | | | | | | | | | 5. F | C |
| 77 N C 2 21.9 321 77 N C 4 21.9 75 77 N C 6 21.5 150 77 N C 6 21.5 150 77 D D 0 21.5 34 77 D D 6 21.5 29 77 D D 6 21.5 29 77 D D 6 21.5 53 77 D D 6 21.5 53 77 N D 0 22.5 93 77 N D 2 22.0 210 78 N D 2 22.0 210 79 N D 2 22.0 210 | | | | | | | | | | 321 | C |
| 17 N C 4 21.9 75 77 N C 6 21.5 150 77 N C 6 21.5 150 77 D D 0 21.5 34 77 D D 6 21.5 29 77 D D 6 21.5 53 77 D D 8 21.5 53 77 N D 0 22.5 93 77 N D 2 22.0 210 78 N D 2 22.0 210 78 N D 2 22.0 210 79 N D 2 22.0 210 | 7 N C 2 21.9 | | | | | | | | | 75 | C |
| 77 N C 6 21.5 485 77 D D 0 21.5 34 77 D D 0 22.1.5 29 77 D D 6 21.5 29 77 D D 8 21.5 53 77 N D 0 22.5 93 77 N D 4 22.0 64 77 N D 6 22.0 25 77 N D 6 22.0 25 | 77 N C 4 21.9 | | | | | | | | | - t | C |
| 77 D D O 21.5 85 77 D D 0 21.5 29 77 D D 6 21.5 29 77 D D 6 21.5 53 77 N D 0 22.5 93 77 N D 2 22.0 210 77 N D 4 22.0 64 77 N D 6 22.0 25 77 N D 6 22.0 25 | 77 N C 6 21.5 | | | | | | | | | 2 |) |
| 77 0 0 2 21.5 34 77 0 0 4 21.5 29 77 0 0 6 21.5 59 77 0 0 8 21.5 93 77 N D 2 22.0 210 77 N D 4 22.0 64 77 N D 5 22.0 25 77 N D 6 22.0 25 | 0 0 | | | | | | | | | 82 | 0 |
| 77 0 0 6 21.5 59 77 0 0 6 21.5 53 77 0 0 8 21.5 53 77 N 0 0 22.5 93 77 N 0 4 22.0 64 77 N 0 6 22.0 25 | | | | | | | | | | 34 | 0 |
| 777 D D 4 21.5 53 53 53 53 53 53 53 53 54 54 55 53 54 55 53 54 55 54 55 54 55 54 55 54 55 55 55 55 | 77 0 0 2 21.3 | | | | | | | | | 29 | 0 |
| 77 D D 6 21.5 77 D D 8 21.5 53 77 N D 0 22.5 93 77 N D 2 22.0 210 64 77 N D 4 22.0 64 77 N D 6 22.0 25 | 77 U U 4 21.5 | | | | | | | | | 0 | 0 |
| 777 D D 8 21.5 53 777 N D 0 22.5 93 777 N D 2 22.0 210 64 777 N D 4 22.0 64 77 N D 6 22.0 25 | .77 D D 6 21.5 | | | | | | | | | 53 | 0 |
| 77 N D 0 22.5 93 210 2 10 64 22.0 25 93 25 93 25 93 210 94 22.0 25 94 95 95 95 95 95 95 95 95 95 95 95 95 95 | .77 D D 8 21.5 | _ | | | | | | | | 93 | 0 |
| 77 N D 2 22.0 210 77 N D 4 22.0 64 25 25 25 25 25 25 25 | .77 N D O 22.5 | _ | | | | | | | | 210 | С |
| 77 N D 4 22.0 64 77 N D 6 22.0 25 | -77 N D 2 22.0 | _ | | | | | | | | 79 | · C |
| -77 N D 6 22.0 25 | -77 N D 4 22.0 | | | | | | | | | ה | o C |
| D 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | -77 N D 6 22.0 | | | | | | | | | 67 | |
| | 2 1 C 8 C N 77 | | | | | | | | | > | |

Appendix 10. Continued.

| Sample | t | Parameter | eters | | | | | Ś | Species/Groups | Group | ý | | | | | | |
|---------|--------|-----------|--------------|------------|----|----|----|----|----------------|-------|----|----|---------|----|-------|-----------------|------|
| Date D | ı St | ta Dp | Temp ot C | ıp AL | SP | SM | γP | 41 | ٩٢ | CP | BR | SS | NS S | FS | Misc. | Total Larvae | Eggs |
| 11 | | | ; | | | | | | | | | | | | | | |
| 11 00 | | | - (| 7 (| | | | | | | | | | | | 0 | 0 |
| 11-60- | | | D | o (| | | | | | | | | | | | 0 | 0 |
| //-60- | | | Э | o | | | | | | | | | | | | 0 | 0 |
| -09-77 | | | ω | က | | | | | | | | | | | | 0 | 0 |
| -11-77 | | | 22. | 5 17 | | | | | | | | | | | | 175 | C |
| -11-77 | | | 21. | 5 87 | | | | | | | | | | | | 87 | c |
| 8-11-77 | Z Z | 14 | 21. | 5 2 | | | | | | | | | | | | 28 | C |
| -11-77 | | | 19. | 2 | | | | | | | | | | | | 0 | 0 |
| 77 | | | Ċ | • | | | | | | | | | | | | | |
| -03-77 | | | 77 | ~ 0 | | | | | | | | | | | | 119 | 0 |
| 77-60- | | | | . | | | | | | | | | | | | 64 | 0 |
| 11-60- | | | 7 | x 0 | | | | | | | | | | | | 34 | 0 |
| 11-60- | | | 21. | 89 | | | | | | | | | | | | 282 | 0 |
| - 10-77 | | | 24 | 0 | | | | | | | | | | | | 186 | 0 |
| - 10-77 | | | 22. | 5 2 | | | | | | | | | | | | 257 | 0 |
| 0-77 | ڻ ح | 4 | 22. | 5 | | | | | | | | | | | | 138 | 0 |
| - 10-77 | | | 22. | 2 64 | | | | | | | | | | | | 64 | 0 |
| | | | | | | | | | | | | | | | | | |
| 8-09-77 | | 0 | 0 | .4 32 | | | | | | | | | | | | 32 | 0 |
| -09-77 | | | 19 | | | | | | | | | | | | | 102 | 0 |
| -09-77 | | | 19 | | | | | | | | | | | | | 170 | 0 |
| -09-77 | | | 19 | | | | | | | | | | | | | 481 | 0 |
| -09-77 | | | 19 | | | | | | | | | | | | | 0 | 0 |
| -11-77 | | | 23 | 5 256 | | | | | | | | | | | | 256 | 0 |
| - 10-77 | | | 22 | ~ | | | | | | | | | | | | 290 | 0 |
| - 10-77 | | | 22 | _ | | | | | | | | | | | | 193 | o C |
| - 10-77 | | | 22 | 8 | | | | | | | | | | | | 245 | C |
| - 10-77 | | | 22 | _ | | | | | | | | | | | | 181 | 0 |
| -00-77 | | | • | | | | | | | | | | | | | (| • |
| 77-00- | | | 2 5 | | | | | | | | | | | | | 36 | 0 |
| 00 | | | n (| | | | | | | | | | | | | 34 | 0 |
| 11-60- | | | <u> </u> | • | | | | | | | | | | | | 64 | 0 |
| //-60- | | | 9 | _ | | | | | | | | | | | | 181 | 0 |
| - 10-11 | | | 23 | • | | | | | | | | | | | | 124 | 0 |
| 11 | z z | 7 | 23 | .0 180 | | | | | | | | | | | | 180 | 0 |
| - 10-77 | | | 23 | _ | | | | | | | | | | | | 125 |) C |
| - 10-77 | | | 22 | | | | | | | | | | | | | 2 | 0 0 |
| | | | i | | | | | | | | | | | | | 96 | 0 |
| | | | | | | | | | | | | | | | | | |
| | - | | | | | | | | | | | | | | | | |

Appendix 10. Continued.

| | Eggs | 0000000 | 0000000 | 000000000 | 0000 | 0000000 |
|----------------|-----------------|--|---------------------------------------|---|---|--|
| | Total Larvae | 0 36 0 1032 265 199 | 0000000 | 00 1 000000 | 0000 | 0000000 |
| | Misc. | | | | | |
| | FS | | | | | |
| | NS | | | | | |
| | SS | | | | | |
| | BR | | | | | |
| Species/Groups | СР | | | | | |
| cies/ | ab G | | | | | |
| Spe | 1.0 | | | | | |
| | | | | | | |
| | ΥР | | | | | |
| | NS. | | | | | |
| | SP | | | | | |
| | AL | 36 1032 265 199 | | . | | |
| S | Temp | 21.9 8.2 8.2 7.9 7.9 22.0 22.0 14.9 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | | 19.0 19.0 19.0 | <u>စ် စ် စ် စု စ စ စ စ</u> ဆုံးဆုံးဆုံးစုံးဆုံးဝ ဝ ဝ ဝ |
| Parameters | Opt | 0 0 0 0 0 0 0 0 0 0 0 0 0 | 00400046 | 0 0 4 4 6 8 0 0 4 4 6 8 | 0 8 4 7 7 7 7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 04400440 |
| Para | Sta | 3333333 | 0000000 | | | 00000000 |
| 1 | 10 | 00002222 | | | | 00002222 |
| Sample | Date | 8-09-77 8-09-77 8-09-77 8-09-77 8-11-77 8-11-77 | | 13-7-13-7-13-7-13-7-13-7-13-7-13-7-13-7 | 13.5 | 9-13-77 9-13-77 9-13-77 9-15-77 9-15-77 9-15-77 |

Appendix 10. Continued.

| Sample Parameters | le Pa | aram(| eter | ŵ | | | | | Sp | Species/Groups | Group | s s | | | | | | |
|-------------------|-------|--------|------------|-------------|----|----|----|----|----|----------------|-------|-----|----|----|----|-------|-----------------|------|
| Date | D1 S1 | Sta Dp | T Dp t | Temp C | AL | SP | SM | γP | 1P | ۵۶ | СР | BR | 88 | NS | FS | Misc. | Total Larvae | Eggs |
| 9-13-77 | | | | | | | | | | | | | | | | | 0 | |
| 9-13-77 | | | | | | | | | | | | | | | | | 0 | 0 |
| 9-13-77 | | | | | | | | | | | | | | | | | 0 | 0 |
| 9-13-77 | | ı ı | . α . α | 19.5 0.0 | | | | | | | | | | | | | 00 | 0 0 |
| 9-15-77 | | | | | | | | | | | | | | | | | 0 | 0 |
| 9-15-77 | | | | | | | | | | | | | | | | | 0 | 0 |
| 9-15-77 | | | | | | | | | | | | | | | | | 0 | 0 |
| 9-15-77 | | | | | | | | | | | | | | | | | 0 | 0 |
| 9-15-77 | | | | | | | | | | | | | | | | | 0 | 0 |
| 9-13-77 | | | | 0.0 | | | | | | | | | | | | | | 0 |
| 9-13-77 | ٥ | ~ | 2 2 | 20.0 | | | | | | | | | | | | | 0 | 0 |
| 9-13-77 | | | | 0.0 | | | | | | | | | | | | | 0 | 0 |
| 9-13-77 | | | | 9.5 | | | | | | | | | | | | | 0 | 0 |
| 9-15-77 | | | | 0.0 | | | | | | | | | | | | | 0 | 0 |
| 9-15-77 | | | | 0.0 | | | | | | | | | | | | | 0 | 0 |
| 9-15-77 | | | | 0.0 | | | | | | | | | | | | | 0 | 0 |
| 9-15-77 | | | | 0.0 | | | | | | | | | | | | | 0 | 0 |
| 9-13-77 | | | | 9.1 | | | | | | | | | | | | | 0 | 0 |
| 9-13-77 | | | | 8.8 | | | | | | | | | | | | | 0 | c |
| 9-13-77 | ٥ | ¥ 1.4 | | 18.8 | | | | | | | | | | | | | 0 | 0 |
| 9-13-77 | | | | 3.0 | | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | | | | , |) |

Densities (no./1,000 $\rm m^3$) for fish eggs and larvae collected at beach (A, B, F) and open G, H, E, W, R) stations in Cook Plant study areas, southeastern Lake Michigan, 1978. Appendix 11. water (C, D,

| Date DI Sta Dpt 4-10-78 D A 0 4-12-78 N A 0 4-12-78 N A 0 4-10-78 D B 0 4-10-78 D B 0 4-10-78 D B 0 4-10-78 D F 0 4-10-78 N F 0 4-10-78 N F 0 | Temp C C C C C C C C C C C C C C C C C C C | AL | a.s | ∑ S | م خ | g E | 9 | GD | BR | 9 | | 7 | Misc. | Total Larvae | |
|---|---|-----|-----|------------|-----|-----|---|----|-----|----|----|----------|---------|-----------------|-------|
| 0022 0022 0022 4444 8888 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | | | | | | | | | 22 | NS | | | | Eggs |
| 022 0022 0022 444 8888 FFFF | 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 | | | | | | | | | | | | | 0 | |
| 22 0022 0022 44 8888 FFFF | 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | | | | | | | | | | | | | 0 | 0 |
| Z 00ZZ 00ZZ 4 8888 FFFF | 5. 7. 7. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. | | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | 0 | 0 |
| | 7.0 6.0 5.0 5.0 | | | | | | | - | 512 | | | | | 512 | |
| 22 0022 88 FFFF | . O O O O | | | | | | | | | | | | | 0 | 0 |
| Z 0022 | | | | | | | | | | | | | | 0 | 0 |
| 00ZZ | 5.0 | | | | | | | | | | | | | 0 | 0 |
| . L L L | 5.0 | | | | | | | | | | | | | c | C |
| ц ц Z Z | | 126 | | | | | | | | | | | | 126 | 0 |
| ı. Z | 0.9 | | | | | | | | | | | | | 0 | . 0 |
| | 0.9 | | | | | | | | | | | | | 0 | 0 |
| -78 D A | 11.9 | | | | | | | | | | | × | | 380 | 0 |
| -78 D A | 11.9 | | | | | | | | | | | × | XX: 141 | 141 | 0 |
| 5-08-78 N A O | 10.0 | | | | | | | | | | | | | 0 | 0 |
| -78 N A | 10.0 | | | | | | | | | | | | | 0 | 4 1 4 |
| -78 D B | 10.0 | | | | | | | | | | | | | 0 | 0 |
| 5-08-78 D B O | 10.0 | | | | | | | | | | | | | 0 | 0 |
| -78 N B | 10.0 | | • | 1320 | | | | | | | | | | 1320 | 0 |
| -78 N B | 10.0 | | | | 699 | | | | | | | | | 802 | 3480 |
| -78 D F | 10.5 | | | | | | | | 190 | | | | | 190 | 0 |
| -78 D F | 10.0 | | | | | | | | | | | | | 0 | 0 |
| 5-08-78 N F O | 10.8 | | | | | 72 | | | | | | | | 72 | 0 |
| -78 N F | 10.8 | | | | | | | | | | | | | 0 | 1791 |
| -14-78 D A | 10.0 | | | | | | | | | | | | | 0 | 0 |
| -14-78 D A | 10.0 | | | | | | | | | | | | | 0 | 0 |
| 6-13-78 N A O | 14.0 | 412 | 103 | | 103 | | | | | | | | | 618 | 47144 |
| -13-78 N A | 14.0 | 337 | | | 338 | | | | | | | | | 675 | 41694 |

Appendix 11. Continued.

| Sampl |) e | Pare | Parameter | ers | | | | | ds S | Species/Groups | /Group | , w | | | | | | |
|--|---------|-----------------|-----------|------------------------------|-----------------------------|-------------|-----|-----|------|----------------|--------|-----|----|----|----|---------|-----------------------------|----------------------------------|
| Date | 10 | Sta | Dpt | Temp | AL | SP | SM | γP | 1.0 | ah | CP | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| 6-14-78 6-14-78 6-13-78 6-13-78 | OOZZ | 8888 | 0000 | 9.5 9.5 15.7 | 229 116 | 114 699 | | 114 | | | | | | | | | 0 0 457 931 | 0 0 1032 2680 |
| 6-14-78 6-14-78 6-13-78 6-13-78 | 00ZZ | | 0000 | 12.0 12.0 16.0 15.5 | 699 699 | 93 223 | | 335 | | | | | | | | | 0 0 186 1227 | 0 0 19221 8933 |
| 7-10-78 7-10-78 7-10-78 7-11-78 | 00ZZ | 4444 | 0000 | 0.41 0.40 0.5 0.5 | 404 1880 1876 666 | 469 2666 | | | | | | | | | | | 404 1880 2345 3332 | 20202 75329 76525 41333 |
| 7-10-78 7-10-78 7-10-78 7-10-78 | 0022 | 80 80 80 | 0000 | 15.0 15.5 10.5 | 2730 2499 408 1010 | 208 | 408 | | | | | | | | | | 2730 2707 816 1010 | 31420 16666 38036 36363 |
| 7-10-78 7-10-78 7-10-78 7-10-78 | 0022 | <u> </u> | 0000 | 4.2 9.0 9.0 | 3397 1824 327 763 | | | | | | | | | | | | 3397 1824 327 763 | 37771 27397 26186 19120 |
| 8-09-78 8-09-78 8-09-78 8-09-78 | 0022 | 4444 | 0000 | 25.2 25.2 21.5 21.5 | 984 1970 816 615 | 272 493 | | | | | | | | | | | 984 1970 1088 1108 | 246 493 1360 1358 |
| 8-09-78 8-09-78 8-08-78 8-08-78 | 0 0 Z Z | 8 8 8 8 | 0000 | 22.0 21.5 21.5 21.5 | 896 3920 546 1122 | 562 | | | | | | · | | | ₹ | XH: 112 | 896 4032 546 1684 | 0 0 1202 803 |
| | | | | | | | | | | | | | | | | | | |

Appendix 11. Continued.

| Date D1 Sta Dpt C 23.0 G64 G69 G69 D1 Sta Dpt C 23.0 G64 G69 G69 D1 Sta Dpt C 23.0 G64 G69 G69 D1 Sta Dpt C 23.0 G64 G69 G69 D1 Sta Dpt C 23.0 G64 G69 G69 G69 G69 G69 G69 G69 G69 G69 G69 | Sample Parameters | ers | | | | | ds | Species/Groups | 'Group | v | | | | | | |
|---|--|------------------------------|----------------------------|-----|----|-----|-----|----------------|--------|----|----|----|----|-------|----------------------------|------|
| D F O 23.0 7828 N F O 23.0 664 N F O 21.0 328 658 N A O 28.2 N A O 27.0 N B O 26.3 N B O 26.3 N F O 25.6 N F O 25.7 N R O 14.4 111 N R O 14.0 N R O 14.4 120 N R O 14.5 N R O 14.5 N R O 14.5 N R O 13.5 N F O 13.8 N F O 13.8 | D1 Sta Dp | - | AL | SP | SM | d × | 4.5 | g, | GD . | BR | SS | NS | FS | MISC. | Total Larvae | Eggs |
| D A 0 28.2 N A 0 28.2 N A 0 27.0 N A 0 27.0 N B 0 26.3 N B 0 25.5 N F 0 25.5 N F 0 25.6 N F 0 25.6 N F 0 25.6 N F 0 25.6 N F 0 25.6 N F 0 25.6 N F 0 25.6 N F 0 25.6 N F 0 25.6 N F 0 25.6 N F 0 25.6 N F 0 25.6 N F 0 14.4 N A 0 14.4 N A 0 14.0 N B 0 14.0 N B 0 14.0 N B 0 14.5 N F 0 13.5 N F 0 13.5 N F 0 13.8 | -09-78 D F -09-78 D F -08-78 N F -08-78 N F | 66 | 7828 664 1441 328 | 658 | | | | | | | | | | | 7828 664 1441 986 | 0000 |
| D B 0 26.3 N B 0 25.0 N B 0 25.5 N F 0 25.5 D F 0 25.6 N F 0 25.6 N F 0 25.6 N F 0 14.4 397 D A 0 14.4 72 N A 0 14.4 72 N B 0 14.4 220 D B 0 14.4 220 N B 0 14.5 75 N F 0 13.8 N F 0 14.5 75 | -11-78 D A -11-78 D A -11-78 N A -11-78 N A | 28.2 28.2 27.0 27.0 | | | | | 149 | | | | | | | | 0 449 | 0000 |
| D F 0 25.5 N F 0 25.6 N F 0 25.6 N F 0 25.6 N F 0 14.4 397 N A 0 14.4 72 N A 0 14.4 111 D B 0 14.4 220 N B 0 14.5 N B 0 14.5 N B 0 13.8 N F 0 13.8 | -11-78 D B -11-78 D B -11-78 N B -11-78 N B | | 120 | | | | | | | | | | | | 0 120 0 | 0000 |
| D A 0 14.4 397 D A 0 14.4 397 N A 0 14.0 72 N A 0 14.0 72 D B 0 14.4 220 N B 0 14.5 220 N B 0 14.5 75 N F 0 13.8 75 | -11-78 D F -11-78 D F -11-78 N F -11-78 N F | ດ ດ ດ ດ ດ | | | | | | | | | | | | | 0000 | 0000 |
| D B 0 14.4 111 D B 0 14.4 220 I N B 0 14.0 I N B 0 13.5 I D F 0 14.5 75 I N F 0 13.8 N F 0 13.8 | 4 4 4 4 0 0 2 2 | 4444 | 397 | | | | | | | | | | | | 397 0 72 0 | 0000 |
| 1 D F O 14.5 1 D F O 14.5 75 1 N F O 13.8 1 N F O 13.8 | -78 D B -78 D B -78 N B | 4 4 4 C | 111 | | | | | | | | | | | | 111 220 0 0 | 0000 |
| | 0 0 Z Z | 41 13 13 | 75 | | | | | | | | | | | | 0 0 0 | 0000 |

Appendix 11. Continued.

| Sample | 0 | Parameter | ers | | | | | SF | Species/Groups | /Group | S | | | | | | |
|----------|------------|-----------|-------|-------|----|----|---|----|----------------|--------|----|----|-----|----|-------|-----------------|------|
| Date D | 1 Sta | ı Dpt | Temp: | AL | SP | S. | γ | 41 | an On | G C | BR | SS | S S | FS | Misc. | Total Larvae | Eggs |
| 16-70 | | • | | 1 1 5 | | | | | | | | | | | | ተ ተ | c |
| 1-16-79 | | 0 | | ? | | | | | | | | | | | | | c |
| 1-16-78 | | 0 | | | | | | | | | | | | | | oc | c |
| 11-16-78 | . 4 . 2 | 0 | 0.0 | | | | | | | | | | | | | 0 | 0 |
| 7 | | • | | | | | | | | | | | | | | c | c |
| 1-16-76 | | 0 | • | | | | | | | | | | | | | o c | 0 |
| 1-15-78 | | 0 | • | | | | | | | | | | | | | o c | o c |
| 78 | . z | 0 | 0.6 | | | | | | | | | | | | | 0 | 0 |
| 1-16-78 | | c | | | | | | | | | | | | | | 0 | 0 |
| 1-16-78 | | 0 | | | | | | | | | | | | | | 0 | 0 |
| 1-15-78 | | 0 | | | | | | | | | | | | | | 0 | 0 |
| 11-15-78 | . L | 0 | | | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | | | (| (|
| -11-78 | | 0 | | | | | | | | | | | | | | 0 | 0 |
| -11-78 | | 0 | • | | | | | | | | , | | | | | 0 (| 0 (|
| -11-78 | | 4 | ٠ | | | | | | | | 9 | | | | | 0.5 | 0 (|
| - 11-78 | | Ф | • | | | | | | | | | | | | | 0 | 0 |
| -27-78 | | 0 | • | | | | | | | | | | | | | 0 | 0 |
| 4-27-78 | o z | 7 | 0.9 | | | | | | | | 1 | | | | | 0 | 0 |
| -27-78 | | 4 | • | | | | | | | | 73 | | | | | E/ | 0 |
| -27-78 | | ဖ | • | | | | | | | | | | | | | 0 | 0 |
| -11-78 | | 0 | | | | | | | | | | | | | | 0 | 0 |
| -11-78 | | 7 | | | | | | | | | | | | | | 0 | 0 |
| -11-78 | | 4 | • | | | | | | | | | | | | | 0 | 0 |
| -11-78 | | 9 | • | | | | | | | | | | | | | 0 | 0 |
| 4-11-78 | 0 0 | œ | 3.5 | | | | | | | | | | | | | 0 | 0 |
| -27-78 | | 0 | • | | | | | | | | | | | | | 0 | 0 |
| -27-78 | | 8 | • | | | | | | | | | | | | | 0 | 0 |
| -27-78 | | 4 | • | | | | | | | | | | | | | 0 | 0 |
| -27-78 | | 9 | | | | | | | | | | | | | | 0 | 0 |
| -27-78 | | æ | • | | | | | | | | | | | 65 | | 65 | 0 |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

Appendix 11. Continued.

| Date D1 Sta Dpt | a S . | w S | ΥP | | | | | | | | | | |
|---|-------|-----|----|----------|--------------|----|----|----|----|----|-------|-----------------|---------------|
| -11-78 D E 0 1 -11-78 D E 0 1 -28-78 N E 0 6 -28-78 N E 14 5 -28-78 N E 14 5 -27-78 N E 20 5 -11-78 D G 0 4 -11-78 D G G 4 -11-78 N G 0 9 -27-78 N G 0 9 -27-78 N G 0 6 -27-78 N G 0 6 -27-78 N G 0 6 -27-78 N G 0 6 -27-78 N G 0 6 -27-78 N G 0 6 -27-78 N G 0 9 | · | · | | <u>.</u> | و | CP | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| -11-78 D E 8 1 -28-78 N E 0 6 -28-78 N E 14 5 -28-78 N E 14 5 -27-78 N E 20 5 -11-78 D G 0 4 -11-78 D G 0 4 -11-78 D G 6 4 -27-78 N G 0 9 -27-78 N G 0 6 -27-78 N G 0 6 -27-78 N G 0 6 -27-78 N G 0 9 | | | | | | | | | | | | c | C |
| -11-78 D E 20 1 -28-78 N E 0 6 -28-78 N E 14 5 -28-78 N E 14 5 -27-78 N E 20 5 -11-78 D G 0 4 -11-78 D G 6 4 -11-78 N G 0 9 -27-78 N G 0 9 -27-78 N G 0 6 -27-78 N G 0 6 -27-78 N G 0 6 -27-78 N G 0 9 | | | | | | | | | | | | 0 | o C |
| -28-78 N E 0 6 -28-78 N E 14 5 -28-78 N E 14 5 -27-78 N E 20 5 -11-78 D G 0 4 -11-78 D G 6 4 -11-78 N G 0 9 -27-78 N G 0 9 -27-78 N G 0 6 -27-78 N G 0 6 -27-78 N G 0 6 -27-78 N G 0 9 | | | | | | | | | | | | 0 | 0 |
| -28-78 N E 8 5 -28-78 N E 14 5 -27-78 N E 14 5 -11-78 D G O 4 -11-78 D G G 4 -11-78 N G O 9 -27-78 N G O 9 -27-78 N G O 6 -27-78 N G O 6 -27-78 N G O 6 -27-78 N G O 6 -27-78 N G O 6 -27-78 N G O 6 -27-78 N G O 6 -27-78 N G O 6 -21-78 N G O 6 -21-78 N G O 9 | | | | | | | | | | | | 0 | 0 |
| -28-78 N E 14 5 -27-78 N E 20 5 -11-78 D G 0 4 -11-78 D G 2 4 -11-78 D G 6 4 -11-78 N G 0 9 -27-78 N G 2 6 -27-78 N G 2 6 -27-78 N G 2 6 -27-78 N G 2 6 | | | | | | | | | | | | 0 | . 0 |
| -27-78 N E 20 5 -11-78 D G O 4 -11-78 D G G 2 4 -11-78 D G G 4 4 -11-78 N G O 9 -27-78 N G 2 6 -27-78 N G 2 6 -27-78 N G 2 6 -21-78 N G 2 6 | | | | | | | | | | | | 0 | 0 |
| -11-78 D G O 4 -11-78 D G 2 4 4 -11-78 D G 6 4 4 -11-78 D G 6 4 -27-78 N G O 9 -27-78 N G 2 6 -27-78 N G 2 6 -27-78 N G 6 6 | | | | | | | | | | | | 0 | 0 |
| 11-78 D G 2 4 4 11-78 D G G 6 4 4 11-78 N G O 9 6 2 6 2 7 -78 N G O 9 6 6 2 6 2 7 -78 N G G G 6 6 6 6 1 -27-78 N G G G 6 6 6 1 -27-78 N G G G G 6 6 6 6 6 1 -27-78 N G G G G G G G G G G G G G G G G G G | | | | | | | | | | | | (| , |
| -11-78 D G 2 4 -11-78 D G 4 4 -11-78 D G 6 4 -27-78 N G 0 9 -27-78 N G 2 6 -27-78 N G 6 6 | | | | | | | | | | | | 0 | J |
| -11-78 D G 4 4 4 -11-78 D G 6 4 4 6 -27-78 N G 2 6 6 6 -27-78 N G 2 6 6 6 -27-78 N G 6 6 6 -11-78 N G 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 | | | | | | | | | | | | 0 | 0 |
| -11-78 D G 6 4 -27-78 N G O 9 -27-78 N G 2 6 6 -27-78 N G 2 6 6 -27-78 N G 6 6 6 -27-78 N G 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 | | | | | | | | | | | | 0 | Ö |
| -27-78 N G O 9 -27-78 N G 2 6 -27-78 N G 4 6 -27-78 N G 6 6 | | | | | | | | | | | | 0 | Ü |
| -27-78 N G 2 6 6 -27-78 N G 4 6 6 -27-78 N G 6 6 6 -14-78 N G 6 7 | | | 23 | | | | | | | | | 23 | Ü |
| -27-78 N G 4 6 -27-78 N G 6 6 | | | | | | | | | | | | 0 | Ü |
| -27-78 N G 6 6 | | | | | | | | | | | | 0 | O |
| -11-78 N H O A | | | | | | | | | | | | 0 | |
| 7 C H C X/-/ | | | | | | | | | | | | | |
| | | | | | | | | | | | | 0 | 0 |
| -11-78 D H 2 4 | | | | | | | | | | | | 0 | 0 |
| -78 D H 4 4 | | | | | | | | | | | | 0 | U |
| -11-78 D H 6 4 | | | | | | | | | | | | 0 | 0 |
| -11-78 D H 8 4 | | | | | | | | | | | | 0 | J |
| -27-78 N H O 9 | | | | | | | | | | | | c | Ü |
| -27-78 N H 2 6 | | | | | | | | | | | | 0 | Ü |
| -27-78 N H 4 6 | | | | | | | 20 | | | | | 20 | O |
| -27-78 N H 6 6 | | | | | | | | | | | | 0 | C |
| -27-78 N H 8 | | | | | | | | | | | | 0 | 0 |
| -11-78 D R O 3. | | | | | | | | | | | | c | |
| -11-78 D R 2 3. | | | | | | | | | | | | C | |
| -11-78 D R 4 3. | | | | | | | | | | | | c | , , |
| -11-78 D R 6 3 | | | | | | | | | | | | · c | , |
| -27-78 N R O 9. | | | | | | | | | | | | c | , |
| -27-78 N R 27 7 | | | | | | | | | | | | · c | , (|
| 4-27-78 N R 4 7 O | | | | | | | | | | | | o c |) C |
| - 23 - 10 N D - 22 - 22 - 23 - 23 - 23 - 23 - 23 - | | | | | | | | | | | | • | > (|
| -2/-/8 N K 6 /-/2- | | | | | | | | | | | | > | 5 |

Appendix 11. Continued.

| Date D1 S | | | | | | | | • | | | | | | | | |
|---|----------------|---------------------------------|----|----|----|---|----|----|----|----|----|-----|----|-------|-----------------|------|
| -11-78 D | a Dpt | Temp | AL | SP | SM | Υ | TP | ۵۲ | СР | BR | 58 | S S | FS | Misc. | Total Larvae | Eggs |
| -11-78 D | | • | | | | | | | | | | | | | 0 (| 0 |
| -11-78 0 | | | | | | | | | | | | | | | 00 | 0 0 |
| -11-78 U -27-78 N | | | | | | | | | | | | | | | 00 | 00 |
| 4-27-78 N W 4-27-78 N W 4-27-78 N W | 14 g | ບ ບ ບ ບ ບ ບ ບ | | | | | | | | | | | | | 000 | 000 |
| -10-78 D | 0 | | | | | | | | | | | | | | 0 | 0 |
| -10-78 D | N 4 (| | | | | | | | | | | | | | 00 | 00 |
| -10-78 U | 9 0 | | | | | | | | | | | | | | 00 | 00 |
| 5-10-78 N C 5-10-78 N C 5-10-78 N C | 041 | 8 8 4 7 5 5 7 | | | | | | | | | | | | | 000 | 000 |
| 2 0/ -01 | D | : | | | | | ٠ | | | | | | | , | 0 | 0 |
| 5-10-78 D D 5-10-78 D D | 0 0 | 8 8 | | | | | | | | | | | | | 00 | 00 |
| -10-78 D -10-78 D | 4 0 | œ œ | | | | | | | | | | | | | 00 | 00 |
| -10-78 D | c | . . . | | | | | | | | | | | | | 00 | 00 |
| -10-78 N | o 01 | 0.0 | | | | | | | | | | | | | 00 | 00 |
| -10-78 N -10-78 N | 4 0 | 0.0 | | | | | | | | | | | | | 00 | 00 |
| -10-78 N | ∞ | 7.5 | | | | | | | | | | | | | 0 | 0 |
| -10-78 D | 0 | 7.2 | | | | | | | | | | | | | 0 | 0 |
| -10-78 D | ω; | 6.7 | | | | | | | | | | | | | 0 | 0 |
| -10-78 D | - C | - u | | | | | | | | | | | | | 0 0 | 00 |
| -10-78 N | 0 | 14.0 | • | | | | | | | | | | | | 0 | 0 |
| -10-78 N | ∞ | 9.5 | | | | | | | | | | | | | 0 | 0 |
| 5-10-78 N E | - 6 | တ တ ယ | | | 26 | | | | | | | | | | 26 | 0 |
| N 9/-01- | 2 | O. 0 | | | | | | | | | | | | | 0 | 0 |

Appendix 11. Continued.

| Total Tota | Sample Parameters | ers | | | | | ďS | Species/Groups | Group | Ø | | | | | | |
|--|--------------------------|------|----|----|----------|----|-----|----------------|-------|----|----|----|----|-------|-----------------|---------------|
| 10-78 D G G O 10.4 10-78 D G G B S S S S S S S S S S S S S S S S S | ate D1 Sta D | | AL | SP | SM | γÞ | 1.0 | ۵b | СР | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| 10-778 N G 6 9 4 9 5 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | -40-78 | 4 0+ | | | | | | | | | | | | | _ c | |
| 10-78 D G 6 4 9.5 10-78 N G 6 5 9.4 10-78 N G 6 6 9.4 10-78 N G 6 8 9.4 10-78 N G 6 8 9.4 10-78 N G 6 8 9.6 10-78 D H G 8 8.6 10-78 D H G 8 8.6 10-78 D H G 8 8.6 10-78 D H G 8 8.6 10-78 N H G 12.0 10-78 N H G 12.0 10-78 N R G 9.3 10-78 N | -10-78 D G | | | | | | | | | | | | | | 0 | 0 |
| 10-78 N G G 9 4 10-78 N G C 8 8 6 10-78 N G C 8 8 6 10-78 N G C 8 8 6 10-78 N G C 8 8 6 10-78 D H C 8 8 6 10-78 D H C 8 8 6 10-78 D H C 8 8 6 10-78 D H C 12 0 10-78 D H C 12 0 10-78 D H C 12 0 10-78 D H C 12 0 10-78 D H C 12 0 10-78 D R C 8 9 2 10-78 D R C 8 9 2 10-78 D R C 8 9 2 10-78 D R C 8 9 3 10-78 D R C 8 9 3 10-78 D R C 8 9 3 10-78 D R C 8 8 9 10-78 D R C 8 8 9 10-78 D R C 8 8 9 10-78 D R C 8 8 9 10-78 D R C 8 8 9 10-78 D R C 8 8 9 10-78 D R C 6 9 10- | -10-78 D G | 9.2 | | | | | | | | | | | | | 0 | 0 |
| 10-78 N G 2 8.3 10-78 N G 2 8.6 10-78 N G 4 8.6 10-78 D H 2 8.6 10-78 D H 4 8.6 10-78 D H 6 8.6 10-78 D H 6 8.6 10-78 D H 6 8.6 10-78 D H 7 12.0 10-78 D H 7 12.0 10-78 D H 8 9.0 10-78 D R 2 9.2 10-78 D R 4 9.2 10-78 D R 6 8.3 10-78 D R 7 9 9.7 10-78 D R 8 6.5 10-78 D R 9 9.0 | -10-78 D G | 9.4 | | | | | | | | | | | | | 0 | 0 |
| 10-78 N G G 8 6 6 9 6 9 6 9 6 9 6 9 6 9 6 9 6 9 6 9 | -10-78 N G | 8.3 | | | | | | | | | | | | | 0 | 0 |
| 10-78 N G 4 B.6 36 36 36 36 36 36 36 36 36 36 36 36 36 | -10-78 N G | 8.6 | | | | | | | | | | | | | 0 | 0 |
| 10-78 D H 0 10.5 10-78 D H 2 8.6 10-78 D H 8 8.6 10-78 N H 2 12.0 10-78 N H 2 12.0 10-78 N H 2 12.0 10-78 N H 4 12.0 10-78 N H 6 12.0 10-78 D R 6 9.7 10-78 D R 7 9.7 10-78 D R 6 9.7 10-78 D R 7 9.2 10-78 D R 6 8.3 10-78 D R 6 8.3 10-78 D R 6 9.0 10-78 D R 7 0 9.0 10-78 D R 8 12.0 10-78 D R 8 12.0 10-78 D R 9 12.0 10-78 D R 9 12.0 | -10-78 N G | 99 Q | | | 36 | | | | | | | | | | 0 % | 00 |
| 10-78 D H 0 10.5 10-78 D H 2 8.6 10-78 D H 6 8 8.6 10-78 D H 8 8 8.6 10-78 D H 8 8 8.6 10-78 N H 10 13.5 10-78 N H 2 12.0 10-78 N H 2 12.0 10-78 N H 8 12.0 10-78 N R 2 9.2 10-78 D R 4 9.2 10-78 N R 2 9.2 10-78 N R 2 9.2 10-78 N R 2 8.5 10-78 N R 2 8.5 10-78 N R 2 8.5 10-78 N R 2 8.5 10-78 N R 2 8.5 10-78 N R 2 8.5 10-78 N R 6 7.0 10-78 N R 6 6.0 10-78 N R 6 12.0 10-78 N R 6 12.0 10-78 N R 6 12.0 10-78 N R 6 12.0 10-78 N R 6 12.0 10-78 N R 6 12.0 10-78 N R 6 12.0 10-78 N R 6 12.0 10-78 N W 8 12.0 10-78 N W 8 12.0 10-78 N W 20 6.0 | 5 N 01-01 | 0 | | | 2 | | | | | | | | | | 8 | > |
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| 10-76 D H 4 8 86 10-76 D H 4 8 86 10-78 D H 8 8 86 10-78 D H 8 8 86 10-78 D H 8 8 86 10-78 N H 2 12.0 10-78 N H 4 12.0 10-78 N H 6 12.0 10-78 D R 2 9.2 10-78 D R 2 9.2 10-78 D R 2 8 5 10-78 D R 8 6 9 10-78 D R 8 6 9 10-78 D W 8 6 5 10-78 D W 8 6 5 10-78 D W 8 12.0 10-78 D W 8 12.0 10-78 D W 14 12.0 10-78 D W 20 6.0 10-78 D W 20 6.0 10-78 D W 20 6.0 10-78 D W 20 6.0 10-78 D W 20 6.0 10-78 D W 20 6.0 10-78 D W 20 6.0 10-78 D W 20 6.0 | -10-78 D H | | | | | | | | | | | | | | 0 | 0 |
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| 100-78 D H 8 8 8.6 100-78 N H 2 12.0 100-78 N H 4 12.0 100-78 N H 4 12.0 100-78 N H 6 12.0 100-78 N H 6 12.0 100-78 D R 0 9.7 100-78 D R 0 9.7 100-78 D R 0 9.0 100-78 N R 0 9.0 100-78 N R 0 9.0 100-78 N R 0 9.0 100-78 N R 0 9.0 100-78 N R 0 8.8 100-78 N M 0 8.8 100-78 N M 0 12.0 100-78 N M 0 12.0 100-78 N M 0 12.0 100-78 N M 0 12.0 100-78 N M 0 12.0 100-78 N M 14 12.0 100-78 N M 14 12.0 100-78 N M 14 12.0 | -10-78 D H | • | | | | | | | | | | | | | 0 | 0 |
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| 10-78 N H 8 9.0 10-78 N H 8 9.0 10-78 D R 2 9.2 10-78 D R 4 9.2 10-78 D R 6 8.3 10-78 D R 6 8.3 10-78 D R 7 9.2 10-78 D R 8 9.0 10-78 N R 2 8.5 10-78 N R 4 8.5 10-78 N R 6 7.0 10-78 N R 6 6.5 10-78 D W 14 6.5 10-78 D W 14 12.0 10-78 N W 14 12.0 10-78 N W 20 6.0 | -10-78 N H | ٠ | | | ć | | | | | | | | | | ၁ ဗွ | o 0 |
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| -10-78 D R 4 9.2 -10-78 N R 6 8.3 -10-78 N R 2 9.0 -10-78 N R 2 8.5 -10-78 N R 4 8.5 -10-78 N R 6 7.0 -10-78 D W 0 8.8 -10-78 D W 20 6.0 -10-78 D W 20 6.0 -10-78 D W 20 6.0 -10-78 D W 20 6.0 -10-78 D W 20 6.0 -10-78 N W 8 12.0 -10-78 N W 20 6.0 -10-78 N W 20 6.0 | -10-78 D R | | | | | | | | | | | | | | 0 | 0 |
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Appendix 11. Continued.

| | . WS | γ | d I | g ₀ | CP | BR | | SN | FS | Misc. | Total Larvae | Eggs |
|--|------|-----|-----|----------------|------|----|--|----|----|-------|-----------------|------|
| | | | | | | | | | | | C | |
| | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | 0 | |
| | | 94 | | | | | | | | | 94 | |
| | 9 | 36 | | | | | | | | | 72 | |
| 2 | | | | | | | | | CC | 58 | 350 | |
| | | 9 | | | | | | | nc | 100 | | |
| | | | | | | | | | × | 100 | 300 | 1594 |
| | | | | | | | | | | | 104 | |
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| | | 43 | | | | | | | | | 43 | |
| | | | | | | | | | × | 125 | 501 | 0 |
| | | | | | | | | | | | 108 | 54 |
| | | 288 | | | | | | | | | 492 | 102 |
| | | | | | | | | | | | 0 | 97 |
| | | | | | | | | | | | 0 | 220 |
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| | 52 | | | | | | | | | | 52 | ũ |
| 94 GP SS SS SS SS SS SS SS SS SS SS SS SS SS | | | | 0 | 1286 | | | | | | | |
| • | | 55 | | | | | | | | | 165 | |
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| ; | 96 | 112 | | | | | | | | | 168 | _ |
| 6 | | | | | | | | | | | 79 | • |
| 82 | | | | | | | | | | | 38 | 232 |
| 93 | | | | | | | | | | | 66 | • |
| • | | | | | | | | | 1 | 1 | | |

Appendix 11. Continued.

| | Eggs | 0000 | 1869 1859 1257 | 0 0 0 0 0 0 0 2553 | 0 0 0 398 47 1453 | 0000000 |
|----------------|-----------------|----------------------------------|---------------------------------|--|--|---|
| | Total Larvae | 132 108 38 0 | 40 32 43 0 272 0 | 0000000 | 00004480 | 0 0 0 0 0 0 0 0 0 |
| | Misc. | | XP: 136 | | | |
| | FS | | | | | |
| | NS | | | | | |
| | SS | | | | | |
| SC | BR | | | | | |
| /Group | G C | | | | | |
| Species/Groups | 9 | | | | | |
| S | 47 | | | | | |
| | γP | 44 54 | 32 136 | | 24 | 197 |
| | SM | 19 | | | | |
| | SP | 19 | | | | |
| | AL | 88 54 | 4 43 | | 9 6 9 8 | 197 |
| er s | Temp | 1 | 8.0 17.0 15.5 15.5 | 6.0 6.0 6.2 6.2 17.5 15.5 15.5 | 0.44 0.44 0.60 0.61 0.61 0.61 | 8 8 8 8 - 9 9 6 0 0 0 0 0 0 0 0 0 |
| arameter | Opt | 0440 | ∞ Ο040 ∞ | 04400440 | 0 8 7 7 0 0 8 7 0 0 0 0 0 0 0 0 0 0 0 0 | 0 0 4 0 0 0 4 0 |
| Para | Sta | IIII | IIIIII | ~~~~~~~ | 3333333 | 00000000 |
| ple | 10 | | 02222 | 00002222 | 00002222 | 00002222 |
| Sampl | Date | - 14 - 7 - 14 - 7 - 14 - 7 | 223323 | 6 - 14 - 78 6 - 14 - 78 6 - 14 - 78 6 - 22 - 78 6 - 22 - 78 6 - 22 - 78 | 6-14-78 6-14-78 6-14-78 6-14-78 6-23-78 6-23-78 | 7-11-78 7-11-78 7-11-78 7-11-78 7-11-78 7-11-78 7-11-78 |

| Date DI Sta Dpt C AL SP SM YP TP JD CP BR SS NS FS MISC. Larvae 7-11-78 D D C 9 C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D D C 6.8 7-11-78 D C C 6.8 7-11-78 D C C 6.8 7-11-78 D C C 6.8 7-11-78 D C C 6.8 7-11-78 D C C C C C C C C C C C C C C C C C C | Date D1 Sta Dpt | | w s | | do l | | S. | M ISC. | Total Larvae 61 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Eggs 0000000000000000000000000000000000 |
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| 11-78 | 11-78 D D 6 6 6 11-78 N D D 8 6 6 11-78 N D D 8 6 6 11-78 N D D 8 6 6 11-78 N D D 8 6 6 11-78 N D E 12-78 N E 144 7 7 11-78 D G 6 8 11-78 D G 6 8 11-78 D G 6 8 11-78 D G 6 8 11-78 D G 6 8 11-78 D G 6 8 11-78 D G 6 8 11-78 D G 6 8 11-78 D G 6 8 11-78 D G 6 8 11-78 D G 6 8 11-78 D G 6 8 11-78 D G 6 8 11-78 D G 6 8 11-78 D G 6 8 11-78 D H 6 7 7 11-78 D H 7 7 11-78 D H 7 11-78 D H 7 11-78 D H 7 11-78 D H 7 11-78 D H 7 11-78 D H 7 11-78 D H 7 11-78 D H 7 11-78 D H 7 11-78 D H 7 11-78 D H 7 11-78 D H 7 11-78 D | 10 4 | | | | | | | 200000000 00040 | |
| 11-78 D D 4 6.8 11-78 D D 6 6.8 11-78 D D 6 6.8 11-78 D D 8 6.0 11-78 D D 8 6.0 11-78 D E 8 0.0 11-78 D E 14 7.0 11-78 D E 14 7.0 11-78 D E 9.0 11-78 D E 9.0 11-78 D G 0 9.9 11-78 D G 0 9.9 11-78 D G 0 9.9 11-78 D G 0 9.9 11-78 D G 0 8.5 11-78 D G 0 8.5 11-78 D G 0 8.5 11-78 D H 0 8 6.0 11-78 D H 0 8 6.0 11-78 D H 0 8 6.0 11-78 D H 0 8 6.0 11-78 D H 0 8 6.0 11-78 D H 0 8 6.0 11-78 D H 0 8 6.0 11-78 D H 0 9.0 11-78 D H 0 7.0 | -11-78 D D 6 6 6 -11-78 N D D 8 6 6 -11-78 N D D 8 6 6 -11-78 N D D 8 6 6 -11-78 N D D 8 6 6 -11-78 N D E 20 7 -12-78 N E 20 7 -12-78 N E 20 7 -11-78 D G 6 8 9 -12-78 N E 20 7 -11-78 D G 6 8 9 -12-78 N G 6 6 8 -12-78 N G 6 6 8 -12-78 N G 6 6 8 -11-78 D G 6 8 8 -11-78 D G 6 8 8 -11-78 D G 6 8 8 -11-78 D G 6 6 8 -11-78 D G 6 6 8 -11-78 D G 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 | 4 | | | | | | | 0000000 00040 | |
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Appendix 11. Continued.

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| -30-78 N D 4 | | i | | | | | | | | | | | | 0 ! | 0 |
| -29-78 N D 6 | | 15 | | | | | | | | | | | | 15 | 0 |
| -29-78 N D 8 | ς. | | | | | | | | | | | | | 0 | 0 |

Appendix 11. Continued.

| | Eggs | 0000000 | 0000000 000000000 | 0000000 |
|------------------|-----------------|--|---|--|
| | Total Larvae | 0000000 | 148 176 188 188 198 198 198 198 198 198 198 198 | 146 17 38 501 0 0 23 |
| | , g | | | 81 61 |
| | Misc | | | d |
| | FS | | | |
| | S. | | | |
| | SS | | | |
| | BR | | | |
| Species/Groups | G _D | | | 17 |
| les/G | 9 | | | |
| Spec | | | | |
| | TP | | | |
| | 4 ≻ | | | |
| | NS. | | | |
| | SP | | 56 | 38 |
| | S | ' | N | ю |
| | AL | | 18 176 176 18 18 19 108 34 48 | 128 38 425 23 |
| | | 10 m m 10 O 10 10 O | | m m m m 0 0 0 0 |
| sus | Temp C | 21.5 18.8 18.8 7.5 7.5 22.0 20.5 20.5 17.0 | 222.0.0 222.0 222.0 222.0 222.0 222.0 222.0 222.0 222.0 222.0 222.0 222.0 222.0 222.0 222.0 22 | 22.8 21.8 21.8 24.0 23.0 23.0 |
| mete | Dpt | 08400840 | 00400040 0040000400 | 00400040 |
| Pare | Sta | | O O O O O O O O O O O O O O O O O O O | ~~~~~~~~ |
| 9 | 10 | 00002222 | | 0000ZZZZ |
| Sample Parameter | e | - 09-78 - 09-78 - 09-78 - 09-78 - 09-78 - 30-78 | -09-78 -09-78 -09-78 -09-78 -30-78 -30-78 -09-78 -09-78 -09-78 -09-78 -09-78 -09-78 -09-78 -09-78 -09-78 -09-78 -09-78 -09-78 -09-78 -09-78 -09-78 -09-78 -09-78 | 9-78 9-78 9-78 9-78 9-78 9-78 |
| | Date | 8-09 8-09 8-30 8-30 8-30 | 80 - 30 - 30 - 30 - 30 - 30 - 30 - 30 - | 8 - 09 8 - 09 8 - 09 8 - 29 8 - 29 8 - 29 |

Appendix 11. Continued.

| Continue | Total Date Di Sta Dpt C Di Sta Dpt C Di Sta Dpt C Di Sta Dpt C Di Sta Dpt C Di Sta Dpt C Di Sta Dpt C Di Sta Dpt C Di Sta Dpt C Di Sta Dpt C Di Sta Dpt C Di Sta Dpt C Di Sta Dpt C Di Sta Dpt C Dpt | Sample Par | Parameters | ers | | | | | ķ | Species/Groups | 'Group | ທ | | | | | | |
|--|--|------------|------------|-------|-----|----|----|----|----|----------------|--------|----|----|-------|----|--------|-----------------|---------------|
| 09-78 D W 0 218 009-78 D W 4 14 18.0 009-78 D W 4 14 18.0 009-78 D W 22.5 009-78 D W 20 22.5 009-78 D D 0 20.2 112-78 D C 0 26.9 112-78 D C 0 26.1 112-78 D C 0 26.9 112-78 D D 0 29.1 112-78 D C 0 20.1 112-78 D D 0 29.1 112-78 D D 0 29.1 112-78 D D 0 29.1 112-78 D D 0 29.1 112-78 D D 0 29.1 112-78 D D 0 29.1 112-78 D D 0 29.1 112-78 D D 0 29.1 112-78 D D 0 29.1 112-78 D D 0 29.1 112-78 D D 0 29.1 112-78 D C 0 26.0 | 09-78 D W 14 18 18 0 0 0 11 8 18 0 0 0 0 1 8 18 0 0 0 0 | 10 e | | - | A L | SP | SM | dλ | 16 | 9 | G G | BR | SS | NS NS | FS | M 1sc. | Total Larvae | Eggs |
| 0.99-78 N W 20 21.5 30-78 N W 20 22.5 30-78 N M 2 | 12-78 | 100 | | 1 | | | | | | | | | | | | | | |
| 09-78 N W 14 18:00 90-78 N W 20 27:5 90-78 N W 20 27:5 90-78 N W 14 22:0 90-78 N W 20 27:5 90-78 N W 20 22:0 90-78 N W 20 22:0 90-78 N M 20 22:0 90-78 N M 20 22:0 90-78 N M 20 22:0 90-78 N M 20 22:0 90-78 N N 2 | 06-78 N W 14 18 18 18 18 18 18 18 18 18 18 18 18 18 | -03-78 D | > α | | | | | | | | | | | | | | 0 | > C |
| 06-78 N W 20 7 5 9 9 7 5 9 9 9 7 7 5 9 9 9 9 9 9 9 9 | 06-78 N W 20 21 5 90 - 7 5 90 - 7 5 90 - 7 5 90 - 7 5 90 - 7 5 90 - 7 5 90 - 7 5 90 - 7 5 90 - 7 8 N W 20 22 5 90 - 7 8 N W 20 22 5 90 - 7 8 N W 20 22 5 90 - 7 8 N W 20 22 5 90 - 7 8 N W 20 22 5 90 - 7 8 N W 20 22 5 90 - 7 8 N W 20 22 5 90 - 7 8 N W 20 22 5 90 - 7 8 N W 20 20 20 20 - 7 8 N W 20 20 20 20 - 7 8 N W 20 20 20 20 - 7 8 N W 20 20 20 20 20 20 20 20 20 20 20 20 20 | 0 87-60- | 2 4 | | | | | | | | | | | | | | o c | o c |
| 90 - 78 N M 8 0 2 2 5 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 30-78 N W 20 22 5 30-78 N W 41 22 0 30-78 N W 41 22 0 30-78 N W 41 22 0 30-78 N W 41 22 0 30-78 N W 42 22 0 30-78 N W 20 22 0 30-78 N D C C 2 26 1 31-78 D D C 2 26 1 31-78 D D C 2 28 0 31-78 D D C 2 28 0 31-78 D D C 2 28 0 31-78 D D C 2 28 0 31-78 D D C 2 28 0 31-78 D D C 2 28 0 31-78 D D C 2 28 0 31-78 D D C 2 28 0 31-78 D D C 2 28 0 31-78 D D C 2 28 0 31-78 D D C 2 26 0 31-78 D D D C 2 26 0 31-78 D D D C 2 26 0 31-78 D D D D D D D D D D D D D D D D D D D | 0 82-60- | 50 | | | | | | | | | | | | | | o C | c |
| 30-78 N W 18 22.4 30-78 N W 18 22.4 30-78 N W 18 22.4 30-78 D C 0 26.3 112-78 D C 2 26.1 112-78 D D 2 29.1 112-78 D D 2 29.1 112-78 D D 2 29.1 112-78 D D 2 29.1 112-78 D D 2 29.1 112-78 D D 2 29.1 112-78 D D 3 2 3.0 112-78 D D 4 280.0 112-78 D D 8 19.8 112-78 D D 8 19.8 112-78 D C 2 26.0 | 30-78 N W H 8 22.4 30-78 N W H 8 22.4 30-78 N W H 8 22.4 30-78 N W H 20 22.0 30-78 N W H 20 22.0 30-78 N W 20 22.0 30-78 N D C 2 26.1 312-78 D D C 24.2 312-78 D D C 24.2 312-78 D D C 24.2 312-78 D D C 24.2 312-78 D D C 24.2 312-78 D D C 24.2 312-78 D D C 24.2 312-78 D D C 24.2 312-78 D D C 24.2 312-78 D D C 25.3 312-78 D D C 25.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C 2 26.0 312-78 D C C C 2 26.0 312-78 D C C C 2 26.0 312-78 D C C C C C C C C C C C C C C C C C C | -30-78 N | 0 | | | | | | | | | | | | | | 0 | 0 |
| 30-78 N M 14 22.0 | 30-78 N W 14 22.0 30-78 N W 20 22.0 30-78 N W 20 22.0 30-78 D C 2 26.1 12-78 D C 2 28.0 12-78 D D 2 29.1 12-78 D D 2 29.1 12-78 D D 2 29.1 12-78 D D 2 29.1 12-78 D D 2 29.1 12-78 D D 2 29.1 12-78 D D 2 29.1 12-78 D D 2 29.1 12-78 D D 2 29.1 12-78 D D 2 29.0 12-78 D D 2 29.1 12-78 D D 2 29.1 12-78 D D 2 29.0 12-78 D 2 29.0 12-7 | -30-78 N | œ | • | | | | | | | | | | | | | 0 | 0 |
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| 112-78 D 6 4 28.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 12-78 D 6 4 28.0 128-78 N D 6 17.0 128-78 N D 6 17.0 128-78 N D 6 17.0 28-78 N D 6 17.0 28-78 N D 6 17.0 29-6 29-78 N D 6 17.0 29-79 D 6 17.0 29-79 D 70 29-70 20-70 20 | -12-78 D | 0 | 28.0 | | | | | | | | | | | | | 0 | 0 |
| 12-78 D E 28.0 28-78 N D O 17.0 28-78 N D E 10 23.3 12-78 D E 10 10 10 10 10 10 10 10 10 10 10 10 10 | 12-78 D G 6 28.0 | -12-78 D | 4 | 28.0 | | | | | | | | | | | | | 0 | 0 |
| 112-78 D B 17.5 50 50 50 50 50 50 50 50 50 50 50 50 50 | 12-78 D B 17.5 50 50 50 50 50 50 50 50 50 50 50 50 50 | -12-78 D | 9 | 28.0 | | | | | | | | | | | | | 0 | 0 |
| 28-78 N D O 17.0 50 28-78 N D O 17.0 104 228-78 N D 6 17.0 270 228-78 N D 6 17.0 270 228-78 N D 6 17.0 96 228-78 N D 6 17.0 96 212-78 D E 0 23.3 212-78 D E 14 19.8 212-78 D E 20 9.1 212-78 D G 0 26.0 | 12-78 N D 0 17.0 50 28-78 N D 0 17.0 270 28-78 N D 6 17.0 270 28-78 N D 6 17.0 96 96 -28-78 N D 8 16.5 0 23.3 12-78 D E 0 23.3 12-78 D E 14 19.8 12-78 D E 20 9.1 12-78 D E 20 9.1 12-78 D E 20 9.1 12-78 D G 0 26.0 | -12-78 D | Φ, | 17.5 | i | | | | | | | | | | | | 0 | 0 |
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| 28-78 N D 4 17.0 270 228-78 N D 6 17.0 96 212-78 N D 6 17.0 96 12-78 D E 8 19.8 112-78 D E 14 19.8 112-78 D G 0 26.0 | 24-78 N D 4 17.0 270 28-78 N D 8 16.5 12-78 D E 0 23.3 12-78 D E 14 19.8 12-78 D E 20 9.1 12-78 D G 0 26.0 12-78 D G 4 26.0 12-78 D G 6 26.0 12-78 D G 6 26.0 12-78 D G 7 2 6.0 13-78 D G 7 2 6.0 14-78 D G 7 2 6.0 15-78 D G 7 2 6.0 16-5 D 7 2 6.0 16- | -28-78 N | 7 | 17.0 | | | | | | | | | | | | | 104 | 0 |
| 28-78 N D 6 17.0 96 -28-78 N D 8 16.5 -12-78 D E 8 19.8 -12-78 D E 14 19.8 -12-78 D G 2 26.0 -12-78 D G 2 26.0 -12-78 D G 4 26.0 -12-78 D G 6 26.0 -12-78 D G 7 2 6.0 -12-78 D G 7 2 6.0 -12-78 D G 6 16.5 -28-78 N G 2 16.5 -28-78 N G 6 16.5 | -28-78 N D 6 17.0 96 -28-78 N D 8 16.5 -12-78 D E 8 19.8 -12-78 D E 14 19.8 -12-78 D G 0 26.0 | -28-78 N | 4 (| 0.71 | | | | | | | | | | | | | 270 | 0 |
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| -12-78 D E 8 19.8 -12-78 D E 14 19.8 -12-78 D G 2 26.0 -12-78 D G 2 26.0 -12-78 D G 4 26.0 -12-78 D G 6 26.0 -12-78 D G 6 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 8 26.0 -12-78 D G 9 26.0 -12-78 D G 9 26.0 -12-78 D G 9 26.0 -12-78 D G 9 26.0 -12-78 D G 9 26.0 -12-78 D G 9 26.0 -12-78 D G 9 26.0 -12-78 D G 9 26.0 -12-78 D G 9 26.0 | -12-78 D E 8 19.8 -12-78 D E 14 19.8 -12-78 D G 0 26.0 -12-78 D G 0 26.0 -12-78 D G 0 26.0 -12-78 D G 0 26.0 -12-78 D G 0 26.0 -12-78 D G 0 16.5 -28-78 N G 0 16.5 -28-78 N G 0 16.5 -28-78 N G 0 16.5 -28-78 N G 0 16.5 -28-78 N G 0 16.5 -28-78 N G 0 16.5 -28-78 N G 0 16.5 | -12-78 D | 0 | (5) | | | | | | | | | | | | | C | C |
| -12-78 D E 14 19.8 -12-78 D G 26.0 -12-78 D G 26.0 -12-78 D G 26.0 -12-78 D G 4 26.0 -12-78 D G 6 26.0 -12-78 D G 6 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 -12-78 D G 7 26.0 | -12-78 D E 14 19.8 -12-78 D E 20 9.1 -12-78 D G 0 26.0 -12-78 D G 0 26.0 -12-78 D G 0 26.0 -12-78 D G 0 16.5 -12-78 D G | -12-78 D | æ | 8.6 | | | | | | | | | | | | | 0 | 0 |
| -12-78 D E 20 9.1 -12-78 D G 26.0 -12-78 D G 26.0 -12-78 D G 4 26.0 -12-78 D G 6 26.0 -12-78 D G 6 26.0 -12-78 D G 7 26.0 -28-78 N G 16.5 -28-78 N G 2 16.5 -28-78 N G 6 16.5 | -12-78 D E 20 9.1 -12-78 D G 0 26.0 -12-78 D G 2 26.0 -12-78 D G 6 2 26.0 -12-78 D G 6 2 26.0 -12-78 D G 6 2 26.0 -12-78 D G 6 2 26.0 -12-78 D G 6 2 2 6.0 -12-78 D G 6 2 2 6.0 -12-78 D G 6 2 2 6.0 -28-78 N G 0 16.5 -28-78 N G 2 16.5 -28-78 N G 6 16.5 | -12-78 0 | 4 | 8.6 | | | | | | | | | | | | | 0 | 0 |
| -12-78 D G O 26.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | -12-78 D G O 26.0 -12-78 D G 2 26.0 -12-78 D G 4 26.0 -12-78 D G 6 26.0 -12-78 D G 6 26.0 -12-78 D G 6 26.0 -28-78 N G 0 16.5 46 -28-78 N G 2 16.5 -28-78 N G 6 16.5 | -12-78 D | 20 | 9.1 | | | | | | | | | | | | | 0 | 0 |
| -12-78 D G 2 26.0 -12-78 D G 4 26.0 -12-78 D G 6 26.0 -12-78 D G 6 26.0 -28-78 N G 0 16.5 46 -28-78 N G 2 16.5 -28-78 N G 4 16.5 | -12-78 D G 2 26.0 -12-78 D G 4 26.0 -12-78 D G 6 26.0 -12-78 D G 6 26.0 -28-78 N G 0 16.5 -28-78 N G 2 16.5 -28-78 N G 6 16.5 | -10-78 D | C | U | | | | | | | | | | | | | c | C |
| 12-78 D G 4 26.0 -12-78 D G 6 26.0 -28-78 N G 0 16.5 46 -28-78 N G 2 16.5 -28-78 N G 4 16.5 -28-78 N G 6 16.5 | 12.78 D G 4 26.0 -12.78 D G 6 26.0 -28.78 N G 0 16.5 46 -28.78 N G 4 16.5 -28.78 N G 6 16.5 | - 42-78 | , | ט כ | | | | | | | | | | | | | 0 | 0 |
| -12-78 D G G 26.0 -28-78 N G O 16.5 46 -28-78 N G 2 16.5 -28-78 N G 4 16.5 -28-78 N G 6 16.5 | -12-78 D G G 26.0 -28-78 N G O 16.5 46 -28-78 N G 2 16.5 -28-78 N G G 16.5 -28-78 N G G 16.5 | -12-78 D | ٧ < | ט ס | | | | | | | | | | | | | > 0 | 0 |
| -28-78 N G O 16.5 46 46 46 46 46 46 46 46 46 46 46 46 46 | -28-78 N G O 16.5 46 46 46 46 46 46 46 46 46 46 46 46 46 | -47-78 0 | י י | ט כ | | | | | | | | | | | | | > 0 | 0 |
| 28-78 N G 2 16.5 -28-78 N G 4 16.5 -28-78 N G 6 16.5 | 28-78 N G 2 16.5 -28-78 N G 6 16.5 | -28-78 N | 0 0 | ט ס | 46 | | | | | | | | | | | | ې د | o c |
| -28-78 N G 4 16.5 -28-78 N G 6 16.5 | -28-78 N G 6 16.5 | N 0/ 07- | , | טי | P | | | | | | | | | | | | p C | > < |
| -28-78 N G 6 16.5 | -28-78 N G 6 16.5 | -28-78 N | ٧ ٧ | ט כ | | | | | | | | | | | | | 0 | O |
| 0 6.01 0 2 0 0/-02- | | 707 | 1 (| 9 (| | | | | | | | | | | | | > 0 | > (|
| | | N 9/-97- | ٥ | ٥ | | | | | | | | | | | | | > | 0 |

Appendix 11. Continued.

| Sam | ple | Par | Sample Parameters | s S | | | | | š | Species/Groups | 'Group | v | | | | | | |
|---------|-----|------------|-------------------|--------------|----|----|----|----|----|----------------|--------|----|----|----|----|-------|-----------------|------|
| Date | 10 | | Sta Dpt | Temp | AL | SP | SM | γP | ТР | an | СР | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| 9-12-78 | | = : | 0 | 24.8 | | | | | | | | | | | | | 00 | 00 |
| 9-12-78 | ۵ ۵ | ΙI | и <u>4</u> | 24.4 24.4 | | | | | | | | | | | | | 00 | 00 |
| 9-12-78 | | I | 9 | 24.4 | | | | | | | | | | | | | 0 (| 0 (|
| 9-12-78 | | II | ω C | 19.0 7.0 | | | | | | | | | | | | | 00 | 00 |
| 9-28-78 | | : = | 0 | 16.5 | 38 | | | | | | | | | | | | 38 | 0 |
| 9-28-78 | | I | 4 | 16.5 | | | | | | | | | | | | | 0 | 0 |
| 9-28-78 | | I | 9 | 16.5 | 52 | | | | | | | | | | | | 52 | 0 |
| 9-28-78 | | I | œ | 16.0 | | | | | | | | | | | | | 0 | 0 |
| 9-12-78 | | œ | 0 | 24.0 | | | | | | | | | | | | | 0 | 0 |
| 9-12-78 | _ | œ | 7 | 24.0 | | | | | | | | | | | | | 0 | 0 |
| 9-12-78 | | œ | 4 | 23.8 | | | | | | | | | | | | | 0 | 0 |
| 9-12-78 | | œ | 9 | 24.0 | | | | | | | | | | | | | 0 | 0 |
| 9-12-78 | | 3 | 0 | 24.0 | | | | | | | | | | | | | 0 | 0 |
| 9-12-78 | ۵ | 3 | œ | 20.1 | | | | | | | | | | | | | 0 | 0 |
| 9-12-78 | | 3 | 14 | 20.1 | | | | | | | | | | | | | 0 | 0 |
| 9-12-78 | | 3 | 20 | 6 6 | | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | | | | | |

Appendix 12. Densities (no./1,000 m^3) for fish eggs and larvae collected at beach (A, B, F) and open water (C, D, G, H, E, W, R) stations in Cook Plant study areas, southeastern Lake Michigan, 1979.

| Date DI Sta Dpt C AL SP SM YP TP UD CP BR SS NS FS MISC. La 112-79 D A 0 9.5 117-79 N A 0 4.0 117-79 N B 0 7.7 117-79 N F 0 4.0 117-79 N B 0 13.0 117-79 N A 0 16.5 117-79 N A 0 16.5 | Total Day Sta Dit from Day State Day Color Broad State Day Color B | | | | |) | | | • | | | | | | | | | | | |
|--|--|-------|----|-----|-----|------|----|-----|-----|-----|---|---|-----|-----|----|-----|----|-------|-----------------|---------------|
| 79 D A 0 9.5 779 N A 0 4.0 779 N A 0 4.0 779 N B 0 7.7 779 D B 0 7.7 779 D F 0 8.0 779 N F 0 4.0 779 N A 0 15.0 779 N A 0 13.0 779 N F 0 13.5 | 79 D A 0 9.5 77 70 8.0 77 70 9.5 70 9 | Date | 10 | Sta | da | Temp | AL | SP | SM | d Y | 4 | 9 | d C | BR | SS | S S | FS | Misc. | Total Larvae | Eggs |
| 79 D A 0 9.5 79 D A 0 9.5 79 D A 0 4.0 79 D B 0 7.7 79 D B 0 7.7 79 D F 0 8.0 79 D A 0 15.0 79 D A 0 15.0 79 D A 0 13.0 79 D B 0 14.5 79 D B 0 13.0 79 D F 0 13.5 79 D F 0 13.5 79 D F 0 13.5 79 D A 0 15.5 79 D A 0 15.5 79 D A 0 15.5 79 D A 0 15.5 79 D A 0 15.5 79 D A 0 15.5 79 D A 0 15.5 79 D A 0 15.5 79 D B 0 13.5 79 D F 0 13.5 70 D F 0 | 79 N A 0 9.5 79 N A 0 4.0 79 N B 0 7.7 79 N B 0 7.7 79 N F 0 4.0 79 N F 0 4.0 79 N A 0 15.0 79 N B 0 14.5 79 N B 0 14.5 70 N B 0 13.0 70 N B 0 13.0 70 N B 0 13.0 70 N B 0 13.5 70 N B 0 14.5 70 N B 0 13.5 70 N B 0 14.5 70 N B 0 14.5 70 N B 0 14.5 70 N B 0 13.5 70 N B 0 14.5 70 N B 0 14. | | | | (| | | | | | | | | | | | | | | |
| 79 N A 0 4.0 79 N A 0 4.0 79 N B 0 7.7 79 N B 0 4.0 79 N B 0 4.0 79 N B 0 4.0 79 N F 0 8.0 79 N F 0 4.0 79 N A 0 15.0 79 N A 0 13.0 79 N B 0 14.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 15.5 79 N B 0 15.5 79 N B 0 15.5 79 N B 0 15.5 79 N B 0 15.5 79 N B 0 15.5 79 N B 0 15.5 79 N B 0 15.5 79 N B 0 15.5 79 N B 0 15.5 79 N B 0 15.5 79 N B 0 15.5 79 N B 0 15.5 79 N B 0 15.5 | 779 N A 0 4.0 779 N B 0 7.7 779 N B 0 7.7 779 N F 0 4.0 779 N F 0 4.0 779 N F 0 4.0 779 N F 0 4.0 779 N F 0 4.0 779 N F 0 4.0 779 N F 0 4.0 779 N F 0 4.0 779 N B 0 14.5 779 N B 0 14.5 779 N B 0 14.5 770 N B 0 14.5 770 N B 0 14.5 770 N B 0 13.5 770 N B 0 14.5 770 N B 0 13.5 770 N B 0 14.5 770 N B 0 | - 12 | | ∢ < | 0 0 | | | | | | | | | | | | | | 0 0 | 00 |
| 79 N A 0 4.0 79 N B 0 7.7 79 N B 0 4.0 79 N B 0 4.0 79 N B 0 4.0 79 N F 0 4.0 79 N F 0 4.0 79 N A 0 15.0 79 N A 0 13.0 79 N B 0 14.5 79 N B 0 13.5 79 N F 0 13.5 79 N B 0 13.5 | 73 N 8 0 7.7 79 N 8 0 7.7 79 N 8 0 7.7 79 N 8 0 7.7 79 N 9 0 8.0 79 N 7 0 15.0 79 N 8 0 13.0 79 N 8 0 13.0 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 13.5 79 N 8 0 18.5 | | | ۲ < | 0 | | | | | | | | | | | | | | > C | > C |
| 79 D B 0 7.7 79 D B 0 7.7 79 D F 0 8.0 79 D A 0 15.0 79 D B 0 14.5 79 D B 0 14.5 79 D B 0 14.5 79 D B 0 14.5 79 D B 0 13.0 79 D B 0 12.5 79 D B 0 13.0 79 D B 0 14.5 79 D B 0 13.0 79 D B 0 14.5 79 D B 0 14.5 79 D B 0 14.5 79 D B 0 14.5 79 D B 0 14.5 79 D B 0 14.5 79 D B 0 14.5 79 D B 0 13.0 70 79 D F 0 13.5 79 D F 0 13.5 79 D F 0 15.5 79 D F 0 15.5 79 D F 0 15.5 79 D F 0 15.5 79 D A 0 18.5 79 D A 0 18.5 79 D A 0 18.5 79 D A 0 18.5 79 D A 0 18.5 79 D A 0 18.5 79 D A 0 18.5 79 D A 0 18.5 79 D A 0 18.5 | 79 D B 0 7.7 | Ŧ | | < ⋖ | 0 | | | | | | | | | | | | | | 00 | 0 |
| 779 D B 0 7.7 779 N B 0 4.0 779 D F 0 8.0 779 D F 0 4.0 779 D A 0 15.0 779 D A 0 15.0 779 D A 0 13.0 779 D B 0 14.5 779 D B 0 14.5 779 D B 0 13.0 779 D B 0 13.0 779 D B 0 13.0 779 D B 0 13.0 779 D B 0 13.0 770 770 D F 0 13.5 770 770 D F 0 12.5 770 D A 0 18.5 770 770 D A 0 18.5 770 770 D A 0 18.5 770 770 770 770 770 770 770 770 770 77 | 79 | -12-7 | | 8 | 0 | | | | | | | | | | | | | | c | C |
| 739 N B 0 4.0 779 N B 0 4.0 779 N F 0 8.0 779 N F 0 4.0 779 N A 0 15.0 779 N A 0 13.0 779 N B 0 14.5 779 N B 0 14.5 779 N B 0 13.0 779 N B 0 13.0 779 N B 0 13.0 779 N B 0 13.5 779 N B 0 13.5 779 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N F 0 12.5 770 N F 0 12.5 770 N F 0 12.5 770 N A 0 18.5 770 N A 0 18.5 770 N A 0 18.5 770 N A 0 18.5 770 N A 0 18.5 770 N A 0 18.5 770 N A 0 18.5 770 N A 0 18.5 770 N A 0 18.5 770 N A 0 18.5 | 779 N B 0 4.0 779 N F 0 8.0 779 N F 0 4.0 779 N F 0 4.0 779 N A 0 15.0 779 N A 0 13.0 779 N B 0 14.5 779 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 13.5 770 N B 0 14.5 770 N B 0 15.5 770 N B 0 16.5 | -12-7 | | 8 | 0 | | | | | | | | | | | | | | 0 | 0 |
| 79 N B 0 4.0 719 D F 0 8.0 719 D F 0 8.0 719 D A 0 15.0 719 D A 0 15.0 719 D B 0 14.5 719 D B 0 14.5 719 D B 0 14.5 719 D B 0 13.0 719 D F 0 13.5 719 D F 0 13.5 719 D F 0 13.5 719 D F 0 13.5 719 D F 0 13.5 719 D A 0 18.5 719 D A 0 | 79 N B O 4.0 79 N F O 8.0 79 N F O 8.0 79 N F O 15.0 79 N A O 15.0 79 N A O 13.0 79 N B O 14.5 79 N B O 13.0 79 N B O 13.0 70 N B O 13.5 70 N F O 12.5 70 N F O | -11-7 | | 89 | 0 | | | | | | | | | | | | | | 0 | 0 |
| 79 D F O 8.0 779 D F O 8.0 779 D A O 15.0 779 D A O 13.0 779 D B O 14.5 779 D B O 14.5 779 D B O 14.5 779 D B O 14.5 779 D B O 13.0 779 D B O 13.0 779 D B O 13.0 779 D B O 13.5 779 D F O 13.5 779 D F O 13.5 779 D F O 13.5 779 D F O 13.5 779 D F O 13.5 779 D F O 13.5 779 D F O 13.5 779 D F O 13.5 770 D F O 13.5 770 D A O 18.5 771 D A O 18.5 773 D A O 18.5 773 D A O 18.5 774 D A O 18.5 775 D A O | 79 D F 0 8.0 | -11-7 | | 8 | 0 | | | | | | | | | | | | | | 0 | 0 |
| 779 D F O 8.0 779 N F O 4.0 779 N A O 15.0 779 N A O 13.0 779 N B O 14.5 779 N B O 13.0 779 N B O 13.0 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N F O 12.5 770 N F O 12.5 770 N F O 12.5 770 N F O 16.5 770 N A O 16.5 770 N A O 16.5 770 N A O 16.5 | 779 N F O 8.0 779 N F O 4.0 779 N F O 4.0 779 N A 0 15.0 779 N A 0 13.0 779 N B O 14.5 779 N B O 13.0 779 N B O 13.5 779 N B O 13.5 779 N B O 13.5 779 N B O 13.5 779 N B O 13.5 779 N B O 13.5 779 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 13.5 770 N B O 18.5 7 | -12 | | ш | 0 | 8.0 | | | | | | | | | | | | | 0 | |
| 73 N F 0 4.0 79 N F 0 4.0 79 N A 0 15.0 79 N A 0 13.0 79 N B 0 14.5 79 N B 0 13.0 70 N B 0 13.5 70 N B 0 13.5 71 N B 0 13.5 72 N B 0 12.5 73 N F 0 12.5 74 N B 0 18.5 75 N F 0 12.5 76 N B 0 18.5 77 N N P 0 18.5 78 N P 0 18.5 79 N P 0 18.5 70 N P 0 18.5 71 N P 0 18.5 71 N P 0 18.5 72 N P 0 N P 0 18.5 73 N P 0 16.5 74 N P 0 16.5 75 N P 0 N P 0 16.5 76 N P 0 16.5 77 N P 0 N P 0 16.5 78 N P 0 16.5 79 N P 0 16.5 | 73 N F 0 4.0 74 N F 0 4.0 75 N F 0 4.0 77 N F 0 15.0 78 N A 0 13.0 79 N B 0 14.5 79 N B 0 14.5 79 N B 0 13.0 79 N B 0 13.0 79 N B 0 13.0 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N B 0 13.5 79 N F 0 12.5 79 N F 0 12.5 79 N F 0 16.5 79 N F 0 16.5 79 N A 0 16.5 79 N A 0 16.5 79 N A 0 16.5 | - 12 | | u. | 0 | 8.0 | | | | | | | | | | | | | 0 | 0 |
| 79 N F O 4.0 79 D A O 15.0 79 D A O 15.0 79 N A O 13.0 79 N B O 14.5 79 D B O 14.5 79 D B O 14.5 79 D B O 13.0 70 N B O 13.5 79 D F O 13.5 79 D F O 13.5 79 D F O 13.5 79 D F O 13.5 79 D F O 12.5 79 D A O 18.5 | 179 N F O 4.0 179 D A O 15.0 179 D A O 15.0 179 D A O 15.0 179 D B O 14.5 170 D B O 14.5 170 D B O 13.0 170 D F O 13.5 170 D F O 13.5 170 D F O 13.5 170 D F O 12.5 170 D A O 18.5 | == | | ıL | 0 | 4.0 | | | | | | | | | | | | | 0 | 0 |
| 79 D A 0 15.0 79 N A 0 13.0 79 D B 0 14.5 79 D B 0 14.5 79 N B 0 13.0 79 D F 0 13.0 79 D F 0 13.5 79 D F 0 13.5 79 N F 0 12.5 79 N F 0 12.5 79 N A 0 18.5 79 A 0 18.5 736 79 A 0 16.5 51.2 79 A 0 16.5 51.2 79 A 0 16.5 51.2 | 79 D A 0 15.0 0 <td>-11</td> <td></td> <td>щ</td> <td>0</td> <td>4.0</td> <td></td> <td>0</td> <td>0</td> | -11 | | щ | 0 | 4.0 | | | | | | | | | | | | | 0 | 0 |
| -79 D A O 15.0 -79 N A O 13.0 -79 N A O 13.0 -79 D B O 14.5 -79 N B O 13.5 -79 D F O 13.5 -79 D F O 13.5 -79 D F O 13.5 -79 D F O 13.5 -79 N F O 12.5 -79 N A O 18.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 | 79 D A 0 15.0 79 N A 0 13.0 79 N A 0 13.0 79 N A 0 13.0 79 D B 0 14.5 70 D B 0 13.0 70 D F 0 13.5 70 D F 0 13.5 70 D F 0 13.5 70 D F 0 12.5 70 D A 0 18.5 70 | -7 | | ⋖ | 0 | 15.0 | | | | | | | | 136 | | | | | 136 | 408 |
| 79 N A 0 13.0 79 N A 0 13.0 79 D B 0 14.5 79 D B 0 14.5 70 70 D F 0 13.5 70 D F 0 13.5 70 D F 0 12.5 70 D A 0 18.5 | 79 N A 0 13.0 -79 N B 0 14.5 -79 D B 0 14.5 -79 N B 0 14.5 -79 N B 0 13.0 -79 N B 0 13.0 -79 N F 0 13.5 -79 N F 0 12.5 -79 N A 0 18.5 -79 N A 0 16.5 -79 N A 0 16.5 | -7 | | 4 | 0 | 15.0 | | | | | | | | | | | | | 0 | 926 |
| 79 N A O 13.0 128 -79 D B O 14.5 -79 D B O 13.5 -79 D F O 13.5 -79 D F O 13.5 -79 D F O 12.5 -79 D A O 18.5 -79 D A O 16.5 | 79 N A O 13.0 128 128 128 128 129 | -7 | | ⋖ | 0 | 13.0 | | | | | | | | | | | | | 0 | 0 |
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| -79 D B O 14.5 189 -79 N B O 13.0 70 -79 N B O 13.5 -79 D F O 13.5 -79 N F O 12.5 -79 N F O 12.5 -79 D A O 18.5 736 -79 N A O 16.5 512 512 | -79 D B O 14.5 | 10- | | 8 | 0 | • | | | | | | | | | | • | | | 0 | 0 |
| 79 N B O 13.0 70 N B O 13.0 70 N B O 13.5 79 D F O 13.5 79 N F O 12.5 79 N F O 12.5 79 D A O 18.5 79 N A O 16.5 79 N A O 16.5 | 79 N B 0 13.0 70 70 70 70 70 70 70 70 70 70 70 70 70 | 10- | | 8 | 0 | • | | | 189 | | | | | | | | | | 189 | O |
| -79 N B O 13.0 70 -79 D F O 13.5 -79 D F O 12.5 -79 N F O 12.5 -79 D A O 18.5 736 -79 N A O 16.5 512 512 | 70 N B O 13.0 70 70 70 70 70 70 70 70 70 70 70 70 70 | -01-7 | | 8 | 0 | | | | | | | | | | | | | | 0 | 0 |
| 79 D F O 13.5 -79 D F O 12.5 -79 D A O 18.5 -79 D A O 18.5 -79 D A O 18.5 -79 D A O 18.5 -79 D A O 16.5 -79 D A O 16.5 -79 D A O 16.5 | -79 D F O 13.5 -79 N F O 12.5 -79 N F O 12.5 -79 N A O 18.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 -79 N A O 16.5 | 01 | | 8 | 0 | • | | | | 70 | | | | | | | | | 70 | 140 |
| -79 D F O 13.5 -79 N F O 12.5 -79 D A O 18.5 -79 D A O 18.5 -79 D A O 16.5 -79 N A O 16.5 -79 N A O 16.5 | -79 D F O 13.5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | -1 | | ıL | 0 | 13.5 | | | | | | | | | | | | | 0 | O |
| -79 N F O 12.5 -79 N F O 12.5 -79 D A O 18.5 -79 D A O 18.5 -79 D A O 16.5 -79 N A O 16.5 | -79 N F O 12.5 O O O O O O O O O O O O O O O O O O O | -7 | | u. | 0 | 13.5 | | | | | | | | | | | | | 0 | O |
| -79 N F O 12.5 -79 D A O 18.5 -79 D A O 18.5 -79 N A O 16.5 -79 N A O 16.5 | -79 N F O 12.5 0 -79 D A O 18.5 736 -79 D A O 18.5 512 512 512 512 00.4 -79 N A O 16.5 512 512 00.4 | -7 | | ı. | 0 | 12.5 | | | | | | | | | | | | | 0 | 0 |
| -11-79 D A O 18.5 137 -11-79 D A O 18.5 736 -12-79 N A O 16.5 512 512 | -11-79 D A O 18.5 137 137 137 137 137 137 137 137 137 137 | | | ı | 0 | 12.5 | | | | | | | | | | | | | 0 | 0 |
| -11-79 D A O 18.5 736 -12-79 N A O 16.5 512 512 -12-79 N A O 16.5 | -11-79 D A O 18.5 736 736 736 736 736 -12-79 N A O 16.5 512 512 0 0 16.5 0 | -11-7 | | ⋖ | 0 | | | | | 137 | | | | | | | | | 137 | 548 |
| -12-79 N A O 16.5 512 512 -12-79 N A O 16.5 | -12-79 N A O 16.5 512 512 1024 -12-79 N A O 16.5 0 | -11-7 | | ⋖ | 0 | | | | | 736 | | | | | | | | | 136 | 2025 |
| -12-79 N A O 16.5 | -12-79 N A O 16.5 | -12-7 | | 4 | 0 | • | | 512 | | 512 | | | | | | | | | 1024 | 0 |
| | | -12-7 | | ⋖ | 0 | | | | | | | | | | | | | | 0 | 0 |

Appendix 12. Continued.

| Sample | 1 | Pare | Parameter | ers | | | | | Js | Species/Groups | /Group | s | | | | | | |
|--|---------|-------------|-----------|------------------------------|------------------------------|-----------------------------|----|-----|-----|----------------|--------|----|----|----|----|-------|-------------------------------|----------------------------|
| Date | 01 | Sta | Dpt | Temp C | AL | SP | SM | д. | 1.0 | g _P | СР | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| 6-11-79 6-11-79 6-12-79 6-12-79 | aazz | 8888 | 0000 | 18.5 16.5 16.5 | | 340 307 3853 3657 | | | | | | | | | | | 340 307 3853 3657 | 1020 1025 0 |
| 6-11-79 6-11-79 6-11-79 6-11-79 | 0 0 Z Z | | 0000 | 18.0 17.0 17.0 | | 120 901 436 | | 150 | | 150 | | | | | | , | 120 0 1201 545 | 42042 59007 752 0 |
| 7-11-79 7-11-79 7-11-79 7-11-79 | 00ZZ | 4444 | 0000 | 25.5 25.5 21.4 21.4 | 1450 2552 945 5836 | 290 196 10603 4089 | | | | | | | | | | | 1740 2748 11548 9925 | 145 0 757 1364 |
| 7-11-79 7-11-79 7-11-79 7-11-79 | 0 0 Z Z | 8888 | 0000 | 25.3 25.3 21.7 21.7 | 1903 1254 1576 5753 | 139 4730 3355 | | | | | | | | | | | 1903 1393 6306 9108 | 0 0 197 0 |
| 7-11-79 7-11-79 7-11-79 7-11-79 | 0 0 Z Z | | 0000 | 24.0 22.0 21.5 | 364 1625 3454 | 7722 20527 | | | | | | | | | | | 0 364 9347 23981 | 0 1092 0 |
| 8-08-79 8-08-79 8-08-79 8-08-79 | 0 0 Z Z | 4444 | 0000 | 26.0 26.0 23.7 23.7 | 102 307 707 876 | 425 292 | | | | | | | | | | | 102 307 1132 1168 | 0000 |
| 8-08-79 8-08-79 8-07-79 8-07-79 | 0 0 Z Z | 8 8 8 8 | 0000 | 25.6 25.6 23.0 23.0 | 988 | 125 | | | | | | | | | | | 0 999 125 336 | 0000 |
| | | | | | | | | | | | | | | | | | | |

Appendix 12. Continued.

| Sampl | o l | Parameters | ters | | | | | <i>เ</i> กิ | Species/Groups | /Group | SC | | | | | | |
|--------------------|------------|------------|--------------|------|-----------|-----|-----|-------------|----------------|--------|----|----|----|----|--------|-----------------|---------------|
| Date D1 | 1 Sta | a Opt | Temp | AL | SP | WS. | d > | 4. | g, | CP | BR | SS | SN | FS | M isc. | Total Larvae | Eggs |
| 62-80- | | 0 | 25.1 | | | | | | | | | | | | | 0 | 0 |
| -08-79 | | 0 0 | 25.1 | , | | | | | | | | | | | | 0 | 0 |
| 8-07-79 | 2 2 | 00 | 24.1 | 577 | 9/4 9/ | | | | | | | | | | | 1197 | 00 |
| -12-79 | | 0 | 23.0 | 1277 | | | | | | | | | | | | 1277 | c |
| -12-79 | | 0 | 23.0 | 6627 | | | | | | | | | | | | 6627 | 0 |
| 9-12-79 9-12-79 | 4 4 Z Z | 00 | 21.4 21.4 | 355 | | | | | | | | | | | | 355 0 | 00 |
| -12-79 | | 0 | | 820 | | | | | | | | | | | | . 00 | C |
| 9-12-79 | 8 | 0 | 21.5 | 5964 | | | | | | | | | | | | 5964 | > C |
| -12-79 | | 0 | | 3508 | | | | | | | | | | | | 3508 | 0 |
| -12-79 | | 0 | 20.8 | 1746 | | | | | | | | | | | | 1746 | 0 |
| -12-79 | | C | | 378 | | | | | | | | | | | | 7 | (|
| -12-79 | | 0 | | 126 | | | | | | | | | | | | 3/8 | > C |
| 2-79 | u Z | 0 | 21.0 | | | | | | | | | | | | | 0 | 0 |
| -12-79 | | 0 | | | | | | | | | | | | | | 0 | 0 |
| .79 | | 0 | | 1447 | | | | | | | | | | | | 1447 | C |
| .79 | | 0 | 9 | 263 | | | | | | | | | | | | 263 | 0 |
| 10-10-79 | 4 4 Z Z | 00 | 4. 4 2. 4 | | | | | | | | | | | | | 0 (| 0 0 |
| | |) | | | | | | | | | | | | | | > | > |
| 6 | 0 8 | 0 | 16.0 | 1050 | | | | | | | | | | | | 1050 | 0 |
| 6 | | 0 | 16.0 | 9846 | | | | | | | | | | | | 9846 | 0 |
| | | 0 | 13.8 | 211 | | | | | | | | | | | | 211 | 0 |
| ກ | | 0 | 13.8 | | | | | | | | | | | | | 0 | 0 |
| | | 0 | 14.2 | 952 | | | | | | | | | | | | 952 | 0 |
| • | | 0 | 14.2 | | | | | | | | | | | | | 0 | 0 |
| _ | u Z | 0 | 13.2 | | | | | | | | | | | | | 0 | 0 |
| _ | | 0 | 13.2 | | | | | | | | | | | | | 0 | 0 |
| | | | | | | | | | | | | | | | | | |

Appendix 12. Continued.

| Total Eggs | Total Dista Dt C AL SP SM YP TP UD CP BR SS NS FS Misc. Larvae Egg 14-79 D A 0 9.0 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D F 0 7.3 14-79 D F 0 7.3 14-79 D F 0 7.3 14-79 D C 0 4.0 16-79 D C 0 | Sample | | Parameter | ters | | | | | v | Species/Groups | /Group | s | | | | | | |
|--|--|--------|-----|-----------|------------|----|----|----|----|-----|----------------|--------|----|----|----|----|-------|-----------------|----------|
| 14-79 D A 0 9.0 14-79 D A 0 9.0 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D F 0 7.6 14-79 D F 0 7.6 14-79 D C 2 4 0 10-79 D C 2 4 4.0 10-79 D C 2 4 4.0 10-79 D C 2 4 5.5 19-79 D C 2 5.5 10-79 D D C 2.5 10-79 D | 14-79 D A 0 9.0 14-79 D A 0 9.0 14-79 D A 0 9.0 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D F 0 7.6 14-79 D F 0 7.6 14-79 D F 0 7.6 14-79 D C 2 4.0 10-79 D C 2 4.0 10-79 D C 6 5 10-79 D C 6 5 10-79 D C 6 5 10-79 D C 6 5 10-79 D C 2 5 10-79 D C 6 5 10-79 D C 70 | te | S 1 | 8 | - | AL | SP | SM | γP | 1.0 | ۵b | CP | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| 14-79 D A O O O O O O O O O O O O O O O O O O | 14-79 N A O B 9 O B O B O B O B O B O B O B O B O | 44.7 | | | ŀ | | | | | | | | | | | | | c | |
| 14-79 N A A O B O B O B O B O B O B O B O B O B | 14-79 N A O 8 9 9 1 14-79 N A O 8 9 9 9 1 14-79 N B O 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 1-14-7 | | | | | | | | | | | | | | | | O C | <i>,</i> |
| 14-79 D 8 0 9.3 | 14-79 N B 0 9.3 | 1-14-7 | | | • | | | | | | | | | | | | | oc | . |
| 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D F 0 7.6 14-79 D F 0 7.6 14-79 D F 0 7.3 10-79 D C 0 4.0 10-79 D C 0 4.0 10-79 D C 0 4.0 10-79 D C 0 4.0 10-79 D C 0 4.0 10-79 D C 0 4.0 10-79 D D 0 2 2.5 10-79 D D 0 3 2.5 10-79 D D 0 3 3.5 10-79 D D 0 3 3.5 10-79 D D 0 3 3.5 10-79 D D 0 3 3.5 10-79 D D 0 3 3.5 10-79 D D 0 3 3.5 10-79 D D 0 3 3.5 10-79 D | 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D B 0 9.3 14-79 D F 0 7.6 14-79 D F 0 7.6 14-79 D C 0 4.0 10-79 D C 0 4.0 10-79 D C 0 6.5 10-79 D C 0 6.5 10-79 D C 0 6.5 10-79 D C 0 6.5 10-79 D C 0 6.5 10-79 D C 0 6.5 10-79 D C 0 6.5 10-79 D D D C 0 6.5 10-79 D D C 0 6.5 10-79 D D D C 0 6.5 10-79 D D D C 0 6.5 10-79 D D D D D | 1-14-7 | | | | | | | | | | | | | | | | 0 | , 0 |
| 14-79 N B 0 9.3 14-79 N B 0 8.9 14-79 N B 0 8.9 14-79 N B 0 8.9 14-79 N B 0 8.9 14-79 N B 0 8.9 14-79 N B 0 8.9 14-79 N F 0 7.3 14-79 N F 0 7.3 14-79 N F 0 7.3 14-79 N F 0 7.3 14-79 N F 0 7.3 14-79 N F 0 7.3 14-79 N C 0 6.5 14-79 N C 0 | 14-79 N 8 0 9.3 14-79 N 8 0 8.9 14-79 N 8 0 8.9 14-79 N 8 0 8.9 14-79 N 7 0 7.6 14-79 N 7 0 7.3 16-79 N 6 0 6.5 16-79 N 6 0 6.5 16-79 N 6 0 6.5 16-79 N 7 0 0 6.5 16-79 N 8 0 0 8.9 16-79 N 8 0 0 8.9 16-79 N 8 0 0 8.9 16-79 N 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 | 1-14-7 | | | σ | | | | | | | | | | | | | c | C |
| 14-79 N B 0 8.9 14-79 N B 0 8.9 14-79 N B 0 8.9 14-79 N F 0 7.6 14-79 N F 0 7.3 14-79 N F 0 7.3 14-79 N F 0 7.3 14-79 N C 0 4.0 14-79 N C 0 6.5 14-79 N C 0 6. | 14-79 N B 0 8.9 14-79 N B 0 8.9 14-79 N B 0 8.9 14-79 N F 0 7.6 14-79 N F 0 7.3 14-79 N F 0 7.3 14-79 N C 2 6.5 16-79 D C 6 4.0 16-79 D C 6 4.0 16-79 D C 6 5.5 16-79 N C 2 6.5 16-79 N C 2 6.5 16-79 N C 2 6.5 16-79 N C 2 6.5 16-79 N C 2 6.5 16-79 N C 2 6.5 16-79 N C 2 6.5 16-79 N C 6 5.5 16-79 N C 6 5.5 16-79 N C 6 5.5 16-79 N C 6 6.5 16-79 N C 6 6.5 16-79 N C 6 6.5 16-79 N C 6 6.5 16-79 N C 6 6.5 16-79 N C 6 6.5 16-79 N C 6 6.5 16-79 N C 6 6.5 16-79 N C 6 6.5 16-79 N C 6 6.5 16-79 N C 6 6.5 16-79 N C 6 6.5 16-79 N C 6 6.5 16-79 N C 7 6 6.0 | 1-14-7 | | | | | | | | | | | | | | | | 0 | , 0 |
| 14-79 N B O 8.9 14-79 D F O 7.6 14-79 N F O 7.6 14-79 N F O 7.6 14-79 N F O 7.3 10-79 D C 2 4.0 10-79 D C 6 4 0 10-79 D C 6 4 0 10-79 N C 6 6.5 10-79 N C 2 6.5 10-79 N C 2 6.5 10-79 N C 2 6.5 10-79 N C 6 5.5 10-79 D D 0 2.5 10-79 D D 0 2.5 10-79 D D 0 2.5 10-79 D D 6 2.5 10-79 D D 6 2.5 10-79 N D 6 6.0 10-79 N D 6 6.0 10-79 N D 6 6.0 | 14-79 N B O B.9 14-79 D F O 7.6 14-79 D F O 7.6 14-79 D F O 7.6 14-79 D F O 7.3 14-79 D F O 7.3 14-79 D F O 7.3 14-79 N F O 7.3 14-79 D C 0 4.0 14-79 D C 0 4.0 14-79 D C 0 4.0 14-79 D C 0 6.5 14-79 D C 0 5.5 14-79 D C 0 6.5 14-79 | -14-7 | | | 80 | | | | | | | | | | | | | 0 | 0 |
| 14-79 | 14-79 D F O 7.6 14-79 D F O 7.6 14-79 N F O 7.3 10-79 N C 2 4.0 10-79 D C 0 4.0 10-79 D C 0 4.0 10-79 D C 0 6.5 19-79 N C 2 6.5 19-79 N C 2 6.5 19-79 N C 2 6.5 19-79 N C 2 6.5 19-79 N C 6 5.5 19-79 N C 6 5.5 19-79 N C 6 5.5 19-79 N C 6 5.5 19-79 N C 6 5.5 19-79 N C 6 5.5 19-79 N C 6 5.5 19-79 N C 6 5.5 19-79 N D D C 6.0 | -14-7 | | | 6 0 | | | | | | | | | | | | | 0 | |
| 14-79 N F 0 7.6 14-79 N F 0 7.3 14-79 N F 0 7.3 10-79 D C 0 4.0 10-79 D C 0 4.0 10-79 D C 0 6 4.0 10-79 N C 2 6.5 19-79 N C 4 6.5 19-79 N C 4 6.5 19-79 N C 5 5.5 10-79 D D 0 2.5 10-7 | 14-79 D F O 7.6 14-79 N F O 7.3 14-79 N F O 7.3 16-79 N F O 7.3 16-79 D C 2 4.0 16-79 D C 2 4.0 16-79 D C 2 4.0 16-79 D C 2 6.5 16-79 N C 0 6.5 16-79 N C 0 6.5 16-79 N C 0 6.5 16-79 N C 0 6.5 16-79 N C 0 6.5 16-79 D D 2 2.5 16-79 D D 2 2.5 16-79 D D 2 2.5 16-79 D D 2 2.5 16-79 D D 2 2.5 16-79 N D 2 2.5 16-79 N D 2 6.0 | -14-7 | | | 7 | | | | | | | | | | | | | 0 | 0 |
| 14-79 N F 0 7.3 14-79 N F 0 7.3 10-79 N C 2 4.0 10-79 D C 2 4.0 10-79 D C 6 5 6.5 19-79 N C 2 6.5 19-79 N C 2 6.5 19-79 N C 2 6.5 19-79 N C 2 6.5 19-79 N C 2 5.5 10-79 D D 2 2.5 10-79 D D 2 2.5 10-79 D D 2 2.5 10-79 D D 6 2.5 10-79 D D 6 2.5 10-79 D D 7 2 6.0 10-79 D D 8 2.8 10-79 N D 6 2.6 19-79 N D 7 6 6.0 | 14-79 N F 0 7.3 14-79 N F 0 7.3 10-79 N C 0 4.0 10-79 D C 0 4.0 10-79 D C 6 4.0 10-79 D C 6 4.0 10-79 N C 0 6.5 19-79 N D C 0 6.0 | -14-7 | | | 7 | | | | | | | | | | | | | 0 | 0 |
| 1-14-79 N F O 7.3 4-10-79 D C 0 4.0 4-10-79 D C 2 4.0 4-10-79 D C 2 4.0 4-10-79 D C 6 4.0 4-19-79 N C 2 6.5 4-19-79 N C 6 6.5 4-19-79 N C 6 5.5 4-10-79 D D 0 2.5 4-10-79 D D 0 2.5 4-10-79 D D 6 2.5 4-10-79 D D 7 2.5 4-10-79 D 7 2.5 4-10-79 D 7 2.5 4-10-79 D 7 3.5 1-14-79 N F O 7.3 4-10-79 D C O 4.0 4-10-79 D C 2 4.0 4-10-79 D C 6 4 4.0 4-10-79 D C 6 6 5 4-19-79 N C 0 6 6.5 4-19-79 N C 0 6 6.5 4-19-79 N C 0 6 5.5 4-10-79 D D 0 2.5 4-10-79 D D 0 2.5 4-10-79 D D 0 2.5 4-10-79 D D 6 2.5 4-10-79 D D 7 2.5 4-10-79 D D 8 2.8 4-10-79 D D 8 2.8 4-10-79 D D 8 2.8 4-10-79 D D 8 2.8 4-10-79 D D 8 2.5 4-10-79 D D 8 2.8 4-10-79 D 8 2.8 4-10-79 D | -14-7 | | | 7. | | | | | | | | | | | | | 0 | 0 |
| 10-79 D C 0 4.0 10-79 D C 2 4.0 10-79 D C 2 4.0 10-79 D C 2 4.0 10-79 D C 6 4.0 19-79 N C 2 6.5 19-79 N C 4 6.5 19-79 N C 6 5.5 10-79 D D 0 2.5 10-79 D D 0 2.5 10-79 D D 8 2.8 10-79 N D 0 5.5 10-79 D D 8 5.5 10-79 D D 8 6.0 19-79 N D 6 6.0 19-79 N D 6 6.0 | -10-79 D C 0 4.0 -10-79 D C 2 4.0 -10-79 D C 2 4.0 -10-79 D C 2 4.0 -19-79 N C 2 6.5 -19-79 N C 2 6.5 -19-79 N C 4 6.5 -19-79 N C 4 6.5 -10-79 D D 2 2.5 -10-79 D D 2 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 7 6 6.0 | 1-14-7 | | | 7. | | | | | | | | | | | | | 0 | 0 |
| -10-79 D C 2 4.0 -10-79 D C 6 4.0 -10-79 D C 6 4.0 -19-79 N C 0 6 4.0 -19-79 N C 2 6.5 -19-79 N C 2 6.5 -19-79 N C 4 6.5 -19-79 D D 0 2.5 -10-79 D D 0 2.5 -10-79 D D 0 4 2.5 -10-79 D D 6 4 2.5 -10-79 D D 6 5.5 -10-79 D D 6 5.5 -10-79 D D 6 6.0 -19-79 N D 6 5.5 -19-79 N D 6 5.5 -19-79 N D 6 6.0 -19-79 N D 6 6.0 | -10-79 D C 2 4.0 -10-79 D C 2 4.0 -10-79 D C 6 4.0 -19-79 N C 2 6.5 -19-79 N C 4 6.5 -19-79 N C 4 6.5 -19-79 N C 6 5.5 -10-79 D D 0 2.5 -10-79 D D 0 2.5 -10-79 D D 0 2.5 -10-79 D D 0 6.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 5.5 -10-79 D D 6 5.5 -10-79 D D 6 5.5 -10-79 D D 6 5.5 -10-79 D D 6 5.5 -10-79 D D 6 5.5 -10-79 D D 70 6.0 | - 10-7 | | | | | | ٠ | | | | | | | | | | | C |
| -10-79 D C 4 4.0 -10-79 D C 6 4.0 -19-79 N C 0 6.5 -19-79 N C 0 6.5 -19-79 N C 2 6.5 -19-79 N C 6 5.5 -10-79 D D 0 2.5 -10-79 D D 0 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 70 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | -10-79 D C 4 4.0 -10-79 D C 6 4.0 -10-79 D C 6 4.0 -19-79 N C 2 6.5 -19-79 N C 4 6.5 -19-79 N C 6 5.5 -10-79 D D 2 2.5 -10-79 D D 2 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 7 2.5 -10-79 D D 7 2 2.5 -10-79 D D 8 2.8 -10-79 N D 6 6.0 -19-79 N D 6 6.0 | - 10-7 | | | | | | | - | | | | | | | | | 0 | |
| -10-79 D C 6 4.0 -19-79 N C 0 6.5 -19-79 N C 0 6.5 -19-79 N C 0 6.5 -19-79 N C 4 6.5 -19-79 N C 6 5.5 -10-79 D D 0 2.5 -10-79 D D 6 2.5 -10-79 D D 7 2.5 -10-79 D 7 2.5 -10 | -10-79 D C 6 4.0 -19-79 N C 0 6.5 -19-79 N C 2 6.5 -19-79 N C 4 6.5 -19-79 N C 6 5.5 -10-79 D D 0 2.5 -10-79 D D 0 2.5 -10-79 D D 8 2.8 -10-79 D D D D D D D D D D D D D D D D D D D | - 10-7 | | | | | | | | | | | | | | | | 0 | 0 |
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| -19-79 N C 2 6.5 -19-79 N C 4 6.5 -19-79 N C 6 5.5 -10-79 D D 0 2.5 -10-79 D D 4 2.5 -10-79 D D 6 2.5 -10-79 D D 8 2.8 -10-79 N D 0 5.5 -10-79 N D 0 6 6.0 -19-79 N D 4 6.0 -19-79 N D 8 5.5 | -19-79 N C 2 6.5 -19-79 N C 4 6.5 -19-79 N C 4 6.5 -10-79 D D 2 2.5 -10-79 D D 4 2.5 -10-79 D D 6 2.5 -10-79 D D 8 2.8 -10-79 D D 8 2.8 -10-79 N D 0 5.5 -19-79 N D 2 6.0 -19-79 N D 6 6.0 | -19-7 | | | • | | | | | | | | | | | | | 0 | 0 |
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| -19-79 N C 6 5.5 -10-79 D D 0 2.5 -10-79 D D 6 2.5 -10-79 D D 6 2.5 -10-79 D D 8 2.5 -10-79 D D 8 2.5 -10-79 N D 0 5.5 -19-79 N D 2 6.0 -19-79 N D 4 6.0 -19-79 N D 8 6.0 | -19-79 N C 6 5.5 -10-79 D D 0 2.5 -10-79 D D 4 2.5 -10-79 D D 6 2.5 -10-79 D D 8 2.8 -10-79 D D 8 2.8 -10-79 N D 0 5.5 -19-79 N D 2 6.0 -19-79 N D 4 6.0 -19-79 N D 6 6.0 -19-79 N D 8 5.5 | -19-7 | | | • | | | | | | | | | | | | | 0 | 0 |
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| -19-79 N D 6 6.0 0 -19-79 N D 8 5.5 0 | -19-79 N D 6 6.0 0 | -19-7 | | | 9 | | | | | | | | | | | | | 0 | 0 |
| -19-79 N D 8 5.5 | -19-79 N D 8 5.5 | -19-7 | | | 9 | | | | | | | | | | | | | 0 | 0 |
| | | -19-7 | | | IJ. | | | | | | | | | | | | | 0 | 0 |

Appendix 12. Continued.

| Sample Parameters Date Distanterrs Species/Groups Total AL SM VP TP UD CP BR SS NS FS MHsc. Laturate Equation 4-10-79 D E B 2.5 C A-10-79 D C D <th>1</th> <th>Eggs</th> <th>0000000</th> <th>0000000</th> <th>00000000</th> <th>0000000</th> | 1 | Eggs | 0000000 | 0000000 | 00000000 | 0000000 |
|--|-------|------------|-----------------|-------------------|---|-----------------|
| Sample Parameters Sample Parameters Date DI Sta Dpt C Al SP SM YP TP UD CP BR SS NS FS Misc. Larvae 10-79 DE 8 2.0 110-79 DE 9 2.5 111-79 NE 14 2.5 110-79 DG 0 3.0 110-79 DG 0 2.5 111-79 NG 0 2.5 111-7 | | Eg | | | | ~ |
| Sample Parameters Sample Parameters Date | | - • | 0000000 | 0000000 | 00000000 | 0000000 |
| Sample Parameters Date DI Ste Dpt C AL SP SM YP TP UD CP BR SS NISC. L 10-79 D E 14 2.0 10-79 D E 25 10-79 D E 25 10-79 D G 2 25 10-79 D | | otal | | | | |
| Sample Parameters Sample Parameters Temp 10-79 D E 0 2.5 110-79 D E 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D H 0 2.5 110-7 | | La | | | | |
| Sample Parameters Sample Parameters Temp 10-79 D E 0 2.5 110-79 D E 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D H 0 2.5 110-7 | | sc. | | | | |
| Sample Parameters Sample Parameters 10-79 D E 0 2.5 11-79 N E 14 2.5 11-79 N E 14 2.5 11-79 N G 0 3.0 11-79 N G 0 2.5 11-79 | | Σ | | | | |
| Sample Parameters Date DI Sta Dpt C AL Sp SM YP TP UD CP BR SS TO STATE Temp 10-79 D E 0 2.5 | | FS | | | | |
| Sample Parameters Date DI Sta Dpt C AL Sp SM YP TP UD CP BR SS TO STATE Temp 10-79 D E 0 2.5 | | S | | | | |
| Sample Parameters Date DI Sta Dpt C AL SP SM YP TP UD CP BR 10-79 D E 8 2.0 10-79 D E 8 2.0 11-79 N E 14 2.5 110-79 D G 0 3.0 110-79 D G 0 3.0 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 110-79 D G 0 2.5 111-79 N G 0 2.5 111-79 N G 0 2.5 111-79 N G 0 2.5 111-79 N G 0 2.5 111-79 N G 0 2.5 111-79 N G 0 2.5 111-79 N G 0 2.5 111-79 N G 0 2.5 111-79 N G 0 2.5 111-79 N H 2 2.5 111-79 N H 2 2.5 111-79 N H 2 2.5 111-79 N H 2 2.5 111-79 N H 2 2.5 111-79 N H 2 2.5 111-79 N H 2 2.5 111-79 N H 2 2.5 111-79 N H 6 2.5 111-79 N H 6 2.5 111-79 N H 7 2 2.5 111-79 N H 8 2.5 111-79 N H 8 2.5 111-79 N H 8 2.5 111-79 N H 8 2.5 111-79 N H 8 2.5 111-79 N H 8 2.5 111-79 N H 8 2.5 111-79 N H 8 2.5 111-79 N H 8 2.5 111-79 N H 8 2.5 111-79 N R 8 6 6.5 | | | | | | • |
| Sample Parameters Date D1 Sta Dpt C AL SP SM YP TP UD CP 10-79 D E 8 2.0 -10-79 D E 14 2.0 -10-79 D E 14 2.0 -10-79 D E 20 2.5 -10-79 D G 0 3.0 -10-79 D G 0 3.0 -10-79 D G 0 2.5 -10-79 D G 0 2.5 -10-79 D G 0 2.5 -10-79 D G 0 2.5 -10-79 D G 0 2.5 -10-79 D G 0 2.5 -10-79 D G 0 2.5 -10-79 D G 0 2.5 -10-79 D G 0 2.5 -10-79 D G 0 2.5 -10-79 D G 0 2.5 -10-79 D G 0 2.5 -10-79 D H 0 3.0 -10-79 D H 0 3.0 -10-79 D H 0 3.0 -10-79 D H 0 4 5.5 -10-79 D H 0 5.5 -10 | | SS | | | | |
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Appendix 12. Continued.

| Date Di Sta Dpt C AL SP SM YP TP JD CP BR SS NS FS Misc. Larvae Eggs 4-10-79 D W 0 2.0 4-10-79 D W 18.2 1.8 4-10-79 D W 18.2 1.8 4-11-79 | Sample | e Par | Parameter | ers | | | | | Sp | Species/Groups | 'Group | w | | | | | | |
|--|---------|-------|------------|----------|----|----|-----|----|----|----------------|--------|----|----|----|----|--------|-----------------|---------------|
| 1-10-79 D W 0 2.0 1-10-79 D W 14 2.0 1-10-79 D W 14 2.0 1-10-79 D W 14 1 2.0 1-10-79 D W 14 1 1.5 1-11-79 N W 14 1 1.5 1-11-79 N W 14 1 1.5 1-11-79 N W 14 1 1.5 1-11-79 N W 14 1 1.5 1-11-79 N W 14 1 1.5 1-11-79 N W 14 1 1.5 1-11-79 N W 14 1 1.5 1-11-79 N W 14 1 1.5 1-11-79 N W 14 1 1.5 1-11-79 N C C 1 12.2 1-10-79 N C C 0 12.2 1-10-79 N C C 0 11.0 1-10-79 N D C 1 1.0 1-10-79 N D C 1.0 1-10-79 | ate D | St | 윱 | - | AL | SP | WS. | ۲۶ | 41 | g, | d S | BR | SS | SN | FS | M iso. | Total Larvae | Eggs |
| 110-79 N W 10 1.5 111-79 N U 1.5 | 70 | | • | ı | | | | | | | | | | | | | | |
| 11-79 N W 20 118 11-79 N W 20 118 11-79 N W 20 118 11-79 N W 20 118 11-79 N W 20 118 11-79 N W 20 118 11-79 N W 20 118 11-79 N W 20 118 11-79 N W 20 118 11-79 N W 20 118 11-79 N W 20 118 11-79 N C 2 12.2 10-79 N C 4 10.0 10-79 N C 6 9.5 10-79 N D 6 9.9 10-79 N D 7 116 10-79 N D 8 9.9 | - 10-79 | | o | • | | | | | | | | | | | | | 0 (| 0 (|
| 11-79 N W W 0 1:5 11-79 N D C 2 12.2 08-79 D C 4 12.2 10-79 N C 6 12.2 10-79 N C 6 12.2 10-79 N C 6 12.2 10-79 N C 6 12.2 10-79 N C 6 12.2 10-79 N C 6 12.2 10-79 N C 6 12.2 10-79 N C 6 12.2 10-79 N C 6 12.2 10-79 N C 6 12.2 10-79 N C 6 12.2 10-79 N D C 6 11.0 10-79 N D C 6 11.0 10-79 N D C 6 11.0 10-79 N D C 7 11.0 10-79 N D C 7 11.0 10-79 N D C 7 11.0 10-79 N D C 8 10.0 10-79 N D C 8 1 | - 10-79 | | • 5 | • | | | | | | | | | | | | | o (| 0 (|
| 11-79 N W 20 1:5 11-79 N W 48 1:5 11-79 N W 48 1:5 11-79 N W 48 1:5 11-79 N W 48 1:5 11-79 N W 48 1:5 11-79 N W 68 1:5 10-79 N C 2 10:0 08-79 D C 3 12:2 08-79 D D 2 11:0 08-79 D D 2 11:0 08-79 D D 3 11:0 08-79 D D 4 11:0 08-79 D D 6 1:6 08-79 D D 6 1:6 08-79 D D 6 1:6 08-79 D D 76 11:0 08-79 D D 8 8:0 08-79 D B 8 9:9 10-79 N D 8 8:0 08-79 D E 14 8:0 08-79 D E 20 8:0 08-79 D E 14 8:0 | - 40-79 | | <u>:</u> | • | | | | | | | | | | | | | > (| > (|
| -11-79 N W 8 1:5 -11-79 N W 14 1:5 -11-79 N W 14 1:5 -11-79 N W 14 1:5 -11-79 N W 14 1:5 -11-79 N W 14 1:5 -10-79 N C 0 12.2 -08-79 D C 0 12.2 -08-79 D C 0 12.2 -10-79 N C 6 12.2 -10-79 N C 6 12.2 -10-79 N C 6 9.5 -10-79 N C 6 9.5 -10-79 N C 7 9.5 -10-79 N C 7 9.5 -10-79 N D 0 11.6 | 10-79 | | 2 | | | | | | | | | | | | | | O (| O |
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| 11-79 N W 20 1.5 08-79 D C 0 12.2 08-79 D C 0 12.2 08-79 D C 0 12.2 08-79 D C 6 12.2 10-79 N C 2 10.0 10-79 N C 4 10.0 243 72 08-79 D D 0 11.0 08-79 D 0 11.0 08-79 D 0 | -11-79 | | 14 | | | | | | | | | | | | | | 0 | > < |
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| 10-79 N C 2 10.0 10-79 N C 2 10.0 10-79 N C 4 10.0 10-79 N C 4 10.0 10-79 N C 4 10.0 10-79 N C 4 10.0 10-79 N C 4 11.0 10-79 N D 2 11.0 10-79 N D 2 11.0 10-79 N D 2 11.0 10-79 N D 2 11.0 10-79 N D 2 11.0 10-79 N D 6 11.0 10-79 N D 6 11.0 10-79 N D 6 11.0 10-79 N D 76 10-79 N D 6 11.0 10-79 N D 6 11.0 10-79 N D 6 11.0 10-79 N D 76 10-79 N D 76 10-79 N D 76 10-79 N D 76 10-79 N D 70 10-79 N D 70 10-79 N D 70 10-79 N D 70 10-79 N D 70 10-79 N D 70 10-79 N D 70 10-79 N D 70 10-79 N D 70 10-79 N D 70 10-79 N D 70 10-79 N D 70 10-70 10-70 N D 70 10-70 10-70 N D 70 10-70 10-70 N D 70 10-70 N D 70 10-70 10-70 N D 70 | -08-79 | | ဖ | ٠ | | | | | | | | | | | | | 0 | 0 |
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| -08-79 D D 8 11.0 -10-79 N D D 2 11.6 -10-79 N D 2 9.9 -10-79 N D 4 9.9 -10-79 N D 6 9.9 -10-79 N D 8 9.9 -10-79 N D 8 9.9 -10-79 N D 8 9.9 -10-79 N D 8 9.9 -10-79 N D 8 9.9 -10-79 N D 8 9.9 -10-79 N E 14 8.0 -10-79 N E 14 7.9 -10-79 N E 14 7.9 -10-79 N E 14 7.9 | -08-79 | | ဖ | <u>.</u> | | | | | | | | | | | | | 0 | 0 |
| -10-79 N D 0 11.6 | -08-79 | | ω . | <u>.</u> | | | | | | | | | | | | | 0 | 0 |
| -10-79 N D 2 9.9 -10-79 N D 4 9.9 -10-79 N D 4 9.9 -10-79 N D 6 9.9 -10-79 N D 8 9.9 -10-79 N D 8 9.9 -08-79 D E 8 8.0 -08-79 D E 14 8.0 -08-79 D E 20 8.0 -08-79 D E 20 8.0 -08-79 D E 20 8.0 -08-79 N E 14 7.9 -09-79 N E 14 7.9 | - 10-79 | | 0 | ٠ | | | | | | | | | | | | | 0 | 0 |
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| -10-79 N D 8 9.9 -08-79 D E 0 8.0 -08-79 D E 14 8.0 -08-79 D E 20 8.0 -08-79 N E 0 10.7 -09-79 N E 14 7.9 -10-79 N E 20 6.9 | - 10-79 | | ဖ | • | | | | | | | | | | | | | 0 | 0 |
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| -08-79 D E 14 8.0 -08-79 D E 14 8.0 -08-79 D E 20 8.0 -09-79 N E 8 7.9 -09-79 N E 14 7.9 -10-79 N E 20 6.9 | 20-20 | |) o | • | | | | | | | | | | | | | > (| > (|
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| | - 10-79 | | 20 | | | | | | | | | | | | | | · c | · C |
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Appendix 12. Continued.

| | Eggs | 0000000 00000000 0000000 0000 | 0000 |
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| | Ö. | | |
| | Misc. | | |
| | FS | 27 | |
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| | SS | | |
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| Species/Groups | Qρ | | |
| is | 1.0 | | |
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| | SM | 82 82 | |
| | SP | | |
| | AL | | |
| Š | Temp C | 0.00042220 0.000000000000000000000000000 | |
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| Sample | Date | 5-08-79 5-08-79 5-08-79 5-08-79 5-09-79 5-09-79 5-09-79 5-09-79 5-09-79 5-09-79 5-09-79 5-09-79 5-09-79 5-09-79 5-09-79 5-09-79 5-08-79 5-08-79 5-08-79 5-08-79 5-08-79 5-08-79 5-08-79 5-08-79 5-08-79 5-08-79 5-08-79 5-08-79 5-08-79 5-08-79 | 5-09-79 5-09-79 5-09-79 5-09-79 |

Appendix 12. Continued.

| Date D1 Sta Dpt C 0 170 | Total Tota | Sampl | o o | Parameter | le te | ស | | | | | Ś | Species/Groups | /Group | õ | | | | | | |
|--|--|--------|-----|-----------|-------|--------------|----|-----|----|-----|---|----------------|--------|----|-----|----|----|--------|-----------------|----------|
| 1977 10 C 0 17.0 | 12-79 0 C 0 17.0 12-79 0 C 6 66.5 12-79 0 C 6 66.5 13-79 N C 2 18.0 13-79 N C 2 13.8 13-79 N C 6 13.8 13-79 N C 6 13.8 13-79 N C 6 13.8 13-79 N C 6 13.8 13-79 N C 6 13.8 13-79 N C 6 13.8 13-79 N C 6 13.8 13-79 N D 1 14 13.1 13-79 N D 2 13.1 13-79 N D 2 13.1 13-79 N D 2 13.1 13-79 N D 2 13.1 13-79 N D 6 13.1 13-79 N D 6 13.1 13-79 N D 6 13.1 13-79 N E 14 11.2 13-79 N E 18 16.0 13-79 N E 20 11.2 13-79 N E 18 16.0 13-79 N E 18 18 18 18 18 18 18 18 18 18 18 18 18 | ate | 2 - | ta | l ta | Temp | AL | SP | SM | ΥP | 4 | 9 | d S | BR | \$8 | SN | FS | Misc. | Total Larvae | Eggs |
| 19779 N C 2 16.0 19779 N C 2 16.0 19779 N C 2 13.8 19779 N C 2 13.8 19779 N C 2 13.8 19779 N C 4 13.8 19779 N D 2 14.8 19779 N D 2 14.9 19779 N D 2 15.0 19779 N D 2 15.0 19779 N D 2 15.0 19779 N D 2 15.0 19779 N D 2 15.0 19779 N D 2 15.0 19779 N D 2 15.0 19779 N D 2 15.0 19779 N D 2 15.0 | 12 13 13 14 14 14 14 14 14 | 100 | | | | ł | | | | | | | | | | | | | | |
| 1979 N C 2 1 16 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 13 15 15 15 15 15 15 15 | - 12-7 | | ر در | ه د | • | | | | | | | | | | | | | 0 | o |
| 19 | 14 14 14 14 14 14 14 14 | -12-7 | | , U | 1 4 | | | | 13 | | | | | | | | | | . C | 0 |
| 19-79 N C C 1448 19-79 N C C 2 13.8 65 32 19-79 N C C 2 13.8 65 32 19-79 N C C 2 13.8 65 32 19-79 N C C 14.8 19-79 D D C 16.0 19-79 D D C 16.0 19-79 D D C 16.0 19-79 D D C 16.0 19-79 D D C 16.0 19-79 D D C 16.0 19-79 D D C 16.0 19-79 D D C 16.0 19-79 D D C 16.0 19-79 D D C 16.0 19-79 D D C 16.0 19-79 D C C C 16.0 19-79 D C C C 16.0 19-79 D C C C 16.0 19-79 D C C C 16.0 19-79 D C C C 16.0 19-79 D C C C 16.0 19-79 D C C C 16.0 19-79 D C C C 16.0 19-79 D C C C 16.0 19-79 D C C C 16.0 19-79 D C C C C 16.0 19-79 D C C C C C C C C C C C C C C C C C C | 1977 N C C 1418 | -12-7 | | · U | . 6 | | | | | | | | | | | | × | | 14 | 0 |
| 113-79 N C 2 13.8 65 73 66 13.0 13.0 13.0 13.0 13.0 13.0 13.0 13.0 | 13-79 N C 2 13.8 65 73 66 13.0 65 13.1 65 13.1 | -13-7 | | ن | 0 | • | | | | | | | | | | | | | 0 | 751 |
| 1979 N C 4 13.8 65 73 73 73 27 73 73 75 75 75 75 75 75 75 75 75 75 75 75 75 | 143-79 N C 4 13.8 65 73 73 74 75 75 75 75 75 75 75 75 75 75 75 75 75 | -13-7 | | ပ | ~ | • | | | | | | | | | | | | | 0 | 1668 |
| 113-79 N C 6 13.0 73 27 27 27 27 27 27 27 27 27 27 27 27 27 | 142-79 N C 6 13.0 73 73 73 73 73 74 74 74 74 74 74 74 74 74 74 74 74 74 | -13-7 | | ပ | 4 | • | | 65 | | | | | | | | | | | 65 | 32625 |
| 112-79 D D O 17.0 12-79 D D S 16.0 12-79 D D S 16.0 12-79 D D S 16.0 12-79 D D S 16.0 13-79 N D O S 13.1 13-79 N D O S 13.1 13-79 N D O S 13.1 13-79 N D O S 13.1 13-79 N D O S 13.1 13-79 N D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D E O 16.0 13-79 D G | -12-79 D D 0 17.0 -12-79 D D 2 16.0 -12-79 D D 2 16.0 -12-79 D D 2 16.0 -12-79 D D 6 16.0 -12-79 D D 6 16.0 -13-79 D D 6 13.1 -13-79 D D 6 13.1 -13-79 D D 6 13.1 -13-79 D D 6 13.1 -13-79 D D 6 13.1 -13-79 D D 6 13.1 -13-79 D D 6 13.1 -13-79 D D 6 14.1 -13-79 D D 6 14.1 -13-79 D D 6 14.1 -13-79 D D 6 14.1 -13-79 D D 6 14.1 -13-79 D D 6 14.1 -13-79 D D 6 14.1 -13-79 D D 6 14.1 -13-79 D D 6 14.1 -13-79 D D 6 14.1 -13-79 D D 6 14.1 -13-79 D D 6 14.1 -13-79 D D 6 14.1 -13-79 D D 6 14.1 -13-79 D D 7 14.1 -13-79 D 7 | -13-7 | | ပ | 9 | | | | 73 | | | | | | | | | | 73 | 27140 |
| -12-79 D D 0 17.0 -12-79 D D 2 16.0 -12-79 D D 4 16.0 -12-79 D D 4 16.0 -12-79 D D 6 16.0 -12-79 D D 6 16.0 -12-79 D D 6 16.0 -13-79 N D 0 14.8 -13-79 N D 6 13.1 -13-79 N D 6 13.1 -13-79 N D 6 13.1 -13-79 N E 14 11.2 -12-79 D E 10 11.2 -12-79 D E 20 11.2 -12-79 D E 20 11.2 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -12-79 D G 0 17.2 -12-79 D G 0 17.2 -12-79 D G 0 17.2 -12-79 D G 0 16.3 -12-79 | 12-79 D D C 16.0 19 | | | , | | | | | | | | | | | | | | | (| (|
| 12-79 D D 2 16.0 19 10 12-79 D D 2 16.0 19 12-79 D D 6 16.0 12 12 22 22 22 22 22 22 22 22 22 22 22 | 12-79 D D 2 16.0 19 10 12-79 D D 2 16.0 19 19 12-79 D D 2 16.0 19 12-79 D D 2 16.0 19 12-79 D D 2 13.1 48 12-79 D E 13.1 48 13.1 48 12.0 19 12 | -12-7 | | ۵ | 0 | | | | | | | | | | | | | | o | O |
| 19-79 D D 6 16.0 19 12-79 D D 6 16.0 12 13-79 D D 6 16.0 12 13-79 D D 6 15.0 22 13-79 D D 6 13.1 48 13-79 D D 6 13.1 48 13-79 D D 6 13.1 69 14-79 D E 14 11.2 69 14-79 D E 14 11.2 69 14-79 D E 14 11.2 69 14-79 D E 14 11.2 69 14-79 D E 14 11.2 69 14-79 D E 14 11.2 69 14-79 D G 0 17.2 69 15-79 D G 0 17.2 69 16-79 D G 0 17.2 69 17-79 D G 0 17.2 69 | 19 14 16.0 19 4 16.0 19 19 19 19 19 19 19 19 19 19 19 19 19 | -12-7 | | ۵ | 7 | | | | | | | | | | | | | | 0 | 0 |
| 12 12 12 12 12 13 14 15 15 15 15 15 15 15 | 12 12 12 12 12 13 13 14 15 15 15 15 15 15 15 | -12-7 | | ۵ | 4 | | | | 19 | | | | | | | | | | 19 | 0 |
| 112-79 D D 8 15.0 | 1-2-79 D 8 15.0 22 1-3-79 N D 0 14.8 48 48 1-3-79 N D 6 13.1 48 48 1-3-79 N D 6 13.1 6 6 1-13-79 N D 6 13.1 6 6 1-12-79 D E 8 11.2 6 6 1-12-79 D E 14 11.2 6 6 1-12-79 N E 8 16.0 6 6 1-13-79 N E 8 16.0 6 6 1-13-79 N E 16.0 7 7 1-13-79 N E 16.0 7 7 1-12-79 N G 16.5 7 7 1-12-79 N G 16.5 7 7 1-12-79 N <t< td=""><td>-12-7</td><td></td><td>Q</td><td>9</td><td></td><td></td><td></td><td>12</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>12</td><td>0</td></t<> | -12-7 | | Q | 9 | | | | 12 | | | | | | | | | | 12 | 0 |
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| -13-79 N D 2 13.1 48 -13-79 N D 4 13.1 0 -13-79 N D 6 13.1 0 -12-79 D E 8 11.2 0 -12-79 D E 8 16.0 0 -13-79 N E 16.0 0 -13-79 N E 14 15.0 0 -13-79 N E 16.0 23 -13-79 N E 11.2 xp: 22 -13-79 N E 16.5 0 -12-79 D G 0 17.2 -12-79 D G 6 16.5 -12-79 N G 6 16.5 -12-79 N G 6 16.0 -12-79 N G 16.0 -12-79 N G 14.0 -12-79 N G 14.0 -12-79 N G 14.0 | -13-79 N D 2 13.1 48 48 -13-79 N D 4 13.1 0 0 -13-79 N D 6 12.0 0 0 -12-79 D E 11.2 12 0 -12-79 D E 14.11.2 12 0 -13-79 N E 16.0 23 23 -13-79 N E 14.15.0 42 23 -13-79 N E 14.15.0 42 23 -13-79 N E 14.15.0 42 23 -13-79 N E 16.5 23 23 -12-79 D G 16.5 2 23 -12-79 D G 16.5 2 2 -12-79 N G 16.5 3 44 -12-79 N G 16.0 44 44 -12-79 N G 16.0 44 44 -12-79 N G 16.0 44 44 -12-79 N G 14.0 46 44 | -13-7 | | ٥ | 0 | 4 | | | | | | | | | | | | | 0 | 366 |
| -13-79 N D 4 13.1 -13-79 N D 6 13.1 -13-79 N D 6 13.1 -13-79 N D 6 13.1 -12-79 D E 14 11.2 -12-79 D E 20 11.2 -13-79 N E 14 15.0 -13-79 N E 20 11.2 -13-79 N E 14 15.0 -13-79 N E 20 17.2 -13-79 N E 20 17.2 -12-79 D G 4 16.5 -12-79 D G 4 16.5 -12-79 D G 4 16.5 -12-79 N G 2 16.5 -12-79 N G 6 16.3 -12-79 N G 6 16.0 -12-79 N G 6 16.0 -12-79 N G 6 16.0 -12-79 N G 6 16.0 -12-79 N G 6 16.0 -12-79 N G 6 16.0 -12-79 N G 6 16.0 -12-79 N G 6 16.0 -12-79 N G 6 16.0 -12-79 N G 6 14.0 -12-79 N G 6 14.0 -13-79 N G 6 14.0 | 13-79 N D 4 13.1 143-79 N D 6 13.1 143-79 N D 6 13.1 15-12-79 D E 14 11.2 112-79 D E 14 15.0 113-79 N E 14 15.0 113-79 N G 16.5 112-79 D G 0 17.2 112-79 D G 0 17.2 112-79 D G 0 17.2 112-79 D G 0 17.2 112-79 D G 0 17.2 112-79 D G 0 17.2 112-79 D G 0 17.2 112-79 D G 0 16.9 112-79 D G | -13-7 | | ٥ | 7 | က | | | 48 | | | | | | | | | | 48 | 48 |
| -13-79 N D 6 13.1 -13-79 N D 6 13.1 -12-79 D E 8 11.2 -12-79 D E 14 11.2 -12-79 D E 14 11.2 -13-79 N E 16.0 -13-79 N E 14 15.0 -13-79 N E 20 11.2 -13-79 N E 20 11.2 -13-79 N E 20 11.2 -12-79 D G 0 17.2 -12-79 D G 0 16.5 -12-79 D G 0 16.5 -12-79 D G 0 16.5 -12-79 D G 0 16.0 | -13-79 N D 6 13.1 -13-79 N D 6 13.1 -12-79 D E 0 16.0 -12-79 D E 14 11.2 -12-79 D E 14 11.2 -13-79 N E 18 16.0 -13-79 N E 18 16.0 -13-79 N E 18 16.0 -13-79 N E 18 16.0 -13-79 D G 0 17.2 -12-79 D G 0 17.2 -12-79 D G 0 16.5 -12-79 D G 0 16.5 -12-79 D G 0 16.5 -12-79 D G 0 16.0 -12-79 N G 2 16.5 -12-79 N G 6 16.3 -12-79 N G 6 16.3 -12-79 N G 6 14.0 -13-79 N G 6 14.0 | -13-7 | | ۵ | 4 | က | | | | | | | | | | | | | 0 | 0 |
| -13-79 N D B 12.0 -12-79 D E 0 16.0 -12-79 D E 14 11.2 -12-79 D E 14 11.2 -12-79 D E 14 11.2 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -13-79 N E 16.0 -13-79 D G 0 17.2 -12-79 D G 0 17.2 -12-79 D G 0 16.0 | 13-79 N D 8 12.0 12-79 D E N 14.12 12-79 D E N 14.12 13-79 N E N 14.2 13-79 N E N 14.2 13-79 N E N 14.2 13-79 N E N 14.2 13-79 N E N 14.2 13-79 N E N 14.2 13-79 N E N 14.2 13-79 N E N 14.2 13-79 N E N 14.2 13-79 N G N 17.2 12-79 D G N 17.2 12-79 D G N 16.5 12-79 D G N 16.5 12-79 D G N 16.5 12-79 N G N 16.5 12-79 N G N 16.5 12-79 N G N 16.0 13-79 N G N 16.0 13-79 N G N 16.0 14-79 N G N 16.0 13-79 N G N 16.0 14-79 N G N 16.0 15-79 N G N 16.0 16-70 N M M 16.0 17-70 N M M 16.0 17-70 N M M 16.0 18-70 N M M 16.0 18-70 N M | -13-7 | | ۵ | 9 | က | | | | | | | | | | | | | 0 | 355 |
| 12-79 D E 0 16.0 12-79 D E 8 11.2 12-79 D E 8 11.2 12-79 D E 14 11.2 13-79 N E 0 16.0 13-79 N E 10 16.0 13-79 N E 10 16.0 13-79 N E 20 11.2 13-79 N E 20 17.2 12-79 D G 0 17.2 12-79 D G 0 17.2 12-79 D G 0 16.0 12-79 D G 0 16.0 12-79 D G 0 16.0 12-79 D G 0 16.0 12-79 D G 0 16.0 12-79 N G 0 16.0 12-79 N G 0 16.0 12-79 N G 0 16.0 12-79 N G 0 16.0 12-79 N G 0 16.0 12-79 N G 0 16.0 12-79 N G 0 16.0 12-79 N G 0 16.0 12-79 N G 0 16.0 12-79 N G 0 16.0 12-79 N G 0 16.0 12-79 N G 0 16.0 | -12-79 D E 0 16.0 -12-79 D E 14 11.2 -12-79 D E 14 11.2 -12-79 D E 14 11.2 -12-79 D E 20 11.2 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -13-79 N E 20 11.2 -12-79 D G 0 17.2 -12-79 D G 0 17.2 -12-79 D G 0 16.0 -12-79 D G 4 16.5 -12-79 D G 6 4 16.5 -12-79 D G 6 4 16.5 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 6 14.0 -12-79 N G 6 14.0 -13-79 N G 6 14.0 -13-79 N G 6 14.0 | -13-7 | | ۵ | 80 | 2 | | | | | | | | | | | | | 0 | 329 |
| -12-79 D E 0 16.0 -12-79 D E 8 11.2 -12-79 D E 14 11.2 -12-79 D E 14 11.2 -13-79 N E 0 16.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -13-79 D G 0 17.2 -12-79 D G 0 17.2 -12-79 D G 0 16.5 -12-79 D G 0 16.0 | -12-79 D E 0 16.0 -12-79 D E 8 11.2 -12-79 D E 14 11.2 -12-79 D E 10 16.0 -13-79 N E 0 16.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -13-79 N E 16.5 -12-79 D G 0 17.2 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 | | | | | | | | | | | | | | | | | | | |
| -12-79 D E 8 11.2 | 12-79 D E 8 11.2 | -12-7 | | | 0 | 9 | | | | | | | | | | | | | 0 | 0 |
| 12 12 12 12 12 12 12 12 12 12 12 12 12 1 | 12 | -12-7 | | | œ | - | | | | | | | | | | | | | 0 | 0 |
| -12-79 D E 20 11.2 -13-79 N E 0 16.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -12-79 D G 0 17.2 -12-79 D G 4 16.5 -12-79 D G 6 16.3 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 | -12-79 D E 20 11.2 -13-79 N E 0 16.0 -13-79 N E 18 16.0 -13-79 N E 18 16.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -12-79 D G 0 17.2 -12-79 D G 4 16.5 -12-79 D G 6 16.3 -12-79 D G 6 16.3 -12-79 D G 71 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 6 14.0 -12-79 N G 6 14.0 | -12-7 | | | 4 | - | | | 12 | | | | | | | | | | 12 | 0 |
| -13-79 N E 0 16.0 -13-79 N E 8 16.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -12-79 D G 0 17.2 -12-79 D G 0 16.5 -12-79 D G 0 16.5 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 -12-79 D G 0 16.0 | -13-79 N E 8 16.0 -13-79 N E 8 16.0 -13-79 N E 8 16.0 -13-79 N E 14 15.0 -12-79 D G 0 17.2 -12-79 D G 4 16.5 -12-79 D G 6 16.3 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 | -12-7 | | | 0 | _ | | | | | | | | | | | | | 0 | 0 |
| -13-79 N E 8 16.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -12-79 D G 0 17.2 -12-79 D G 0 16.3 -12-79 D G 0 16.0 -12-79 D G 4 16.5 -12-79 D G 6 16.0 -12-79 N G 0 16.0 -12-79 N G 7 1 44 -13-79 N G 6 14.0 -12-79 N G 6 14.0 -12-79 N G 6 14.0 | -13-79 N E 8 16.0 -13-79 N E 14 15.0 -13-79 N E 14 15.0 -12-79 D G 0 17.2 -12-79 D G 4 16.5 -12-79 D G 6 16.0 -12-79 D G 74 16.5 -12-79 D G 74 16.0 -12-79 D G 6 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 | -13-7 | | | C | g | | | | | | | | | | | | | 0 | 0 |
| -13-79 N E 14 15.0 -13-79 N E 20 11.2 -12-79 D G 0 17.2 -12-79 D G 4 16.5 -12-79 D G 0 16.0 -12-79 D G 4 16.0 -12-79 N G 0 16.0 -12-79 N G 4 15.0 -12-79 N G 6 14.0 -12-79 N G 6 14.0 -12-79 N G 6 14.0 | -13-79 N E 14 15.0 -13-79 N E 20 11.2 -12-79 D G 0 17.2 -12-79 D G 4 16.5 -12-79 D G 6 16.3 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 -12-79 N G 0 16.0 | -13-7 | | | α | ی | | | 93 | | | | | | | | | | 23 | 47 |
| -13-79 N E 20 11.2 | -13-79 N E 20 11.2 | -13-7 | | | 4 | , L | | | 42 | | | | | | | | | | 42 | 99 |
| -12-79 D G 0 17.2 0 -12-79 D G 2 16.5 0 0 17.2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | -12-79 D G 0 17.2 0 -12-79 D G 2 16.5 0 -12-79 D G 2 16.5 0 0 -12-79 D G 4 16.5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | -13-7 | | | 0 | | | | ļ | | | | | | | | × | | 22 | 0 |
| -12-79 D G 0 17.2 -12-79 D G 2 16.5 -12-79 D G 2 16.5 -12-79 D G 4 16.5 -12-79 N G 0 16.0 -13-79 N G 4 15.0 -12-79 N G 6 14.0 -12-79 N G 6 14.0 -12-79 N G 6 14.0 -12-79 N G 6 14.0 | -12-79 D G 0 17.2 -12-79 D G 2 16.5 -12-79 D G 2 16.5 -12-79 D G 4 16.5 -12-79 D G 6 16.0 -12-79 N G 0 16.0 -13-79 N G 2 15.0 -12-79 N G 6 14.0 -12-79 N G 6 14.0 -12-79 N G 6 14.0 | | | | | | | | | | | | | | | | | | | |
| -12-79 D G 2 16.5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | -12-79 D G 2 16.5 -12-79 D G 4 16.5 -12-79 D G 6 16.3 -12-79 N G 0 16.0 -13-79 N G 2 15.0 -13-79 N G 4 15.0 -12-79 N G 6 14.0 -12-79 N G 6 14.0 | -12-7 | | G | 0 | 7 | | | | | | | | | | | | | 0 | 0 |
| -12-79 D G 4 16.5 0 12 12 12 12 12 12 12 12 12 12 12 12 12 | -12-79 D G 4 16.5 0 12 12 12 12 12 12 12 12 12 12 12 12 12 | -12-7 | | G | 7 | 9 | | | | | | | | | | | | | 0 | 0 |
| -12-79 D G 6 16.3 12 12 12 12 12 12 12 12 12 12 12 12 12 | -12-79 D G 6 16.3 12 12 12 12 12 12 12 12 12 12 12 12 12 | -12-7 | | G | 4 | 9 | | | | | | | | | | | | | 0 | 0 |
| -12-79 N G O 16.0 71 71 71 71 71 71 71 71 71 71 71 71 71 | -12-79 N G O 16.0 71 71 71 71 71 71 71 71 71 71 71 71 71 | -12-7 | | G | 9 | œ. | | | | 12 | | | | | | | | | 12 | 0 |
| -13-79 N G 2 15.0 44 44 -12-79 N G 4 15.0 0 466 XP: 193 659 | -13-79 N G 2 15.0 44 44 44 44 44 44 44 44 44 44 44 45.0 0 466 14.0 466 466 466 466 47 47 466 47 47 466 47 47 466 47 47 466 47 47 466 47 47 466 47 47 47 466 47 47 47 47 47 47 47 47 47 47 47 47 47 | -12-7 | | G | 0 | 9 | | | | 7.1 | | | | | | | | | 7.1 | 0 |
| -12-79 N G 4 15.0 0 -12-79 N G 6 14.0 466 | -12-79 N G 4 15.0 0 | -13-7 | | G | 7 | ъ. | | | | 44 | | | | | | | | | 44 | 0 |
| -12-79 N G 6 14.0 466 XP: 193 659 | -12-79 N G 6 14.0 466 E59 | -12-7 | | G | 4 | 5 | | | | | | | | | | | | | 0 | 43 |
| | | -12-7 | | G | 9 | 4 | | 466 | | | | | | | | | × | P: 193 | 629 | 0 |

Appendix 12. Continued.

| Dete | Sample Par | arameter | ers | | | | | Sp | Species/Groups | 'Group | Ø | | | | | | |
|--|----------------------|----------|------------|-------|-----|----|-----|------|----------------|--------|----|----|----|----|-------|-----------------|----------|
| 12-79 D H 0 16.5 12-79 D H 6 15.5 113-79 D H 6 14.3 113-79 D R 113.0 11 | ate D1 St | da | - | AL | SP | SM | γ | TP 4 | g, | CP | BR | SS | SN | FS | Misc. | Total Larvae | Eggs |
| 12779 D H 7 16.5 | | | (| | | | | | | | | | | | | 0 | 0 |
| 12.79 D H 4 15.5 | -12-79 D | | س ف | ٠ | | | | | | | | | | | | 0 | 0 |
| 13.79 D H 6 15.5 | -12-/9 U | | | | | | 18 | | | | | | | | | 18 | 0 |
| 1979 D H B 14.5 1979 D H H C 14.3 1979 D N H D 15.2 1979 D N H D 14.3 1979 D N H D 14.3 1979 D N R D 17.4 1979 D N R D 14.3 1979 D N R D 19.0 1979 D N R D 19.0 1979 D N N D 16.0 1979 D N N D 16.0 1970 D N N D 16.0 1970 D N N D 16.0 1970 D N N D 16.0 1970 D N N D 16.0 1970 D N N D 16.0 1970 D N N D 16.0 1970 D N N D 16.0 1970 D N N D 16.0 1970 D N N D 16.0 1970 D N N D 16.0 1970 D N N D 16.0 1970 D N N D 16.0 1970 D N N D 16.0 1970 D N N D 16.0 1970 D N D 17.5 1970 D N D 17.5 | -12-79 D | | വ | | | | 5 | | | | | | | | | 13 | 0 |
| 15.79 N H O 15.2 | -12-79 D | | . 4 | | | | | | | | | | | | | 0 | 0 |
| 1979 N H 2 14.3 1979 N H 4 14.3 N H 6 14.3 N H 6 14.3 N H 6 14.3 N H 6 14.3 N H 6 14.3 N H 6 14.3 N H 6 14.3 N H 6 14.3 N H 7 17.2 112-79 D R 7 17.2 113-79 N R 6 14.3 113-79 N R 6 13.5 113-79 N R 6 13.5 113-79 N R 6 13.5 113-79 N R 11.5 113-79 N R 13.0 111-79 N C 2 17.7 3807 53 194 | -13-79 N | | | | | 27 | 27 | | | | | | | | | 54 | 27 |
| 19779 N H 4 14.3 | -13-79 N | | 4 | | | | | | | | | | | | | 0 (| o į |
| 19779 N H 6 14.3 89 89 89 89 89 89 89 89 89 89 89 89 89 | -13-79 N | | 4. | | | | | | | | | | | | | 0 (| 45 |
| -13-79 N H B 13.0 56 -14-79 D R 0 17.4 -12-79 D R 6 16.2 -12-79 D R 6 16.2 -12-79 D R 6 16.2 -13-79 N R 0 16.0 -13-79 N R 6 13.5 -13-79 N R 6 13.5 -13-79 D W 8 11.5 -12-79 D W 8 11.5 -12-79 D W 14 11.5 -12-79 D W 14 13.0 -12-79 D W 14 13.0 -12-79 D W 14 13.0 -12-79 D W 14 13.0 -12-79 D W 14 13.0 -12-79 D W 14 13.0 -12-79 D W 14 13.0 -12-79 D W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -14-79 N W 14 13.0 -14-79 D C 0 19.0 -14-79 D C 0 17.5 1608 -14-79 D C 0 17.5 98 -14-79 N C 0 2 17.7 1320 31 31 1382 -14-79 N C 0 2 17.7 3507 53 194 -14-79 N C 6 17.2 2723 194 -14-79 N C 6 17.2 2723 194 | -13-79 N | | • | | | 83 | | | | | | | | | | ກເ | 0 (|
| 112-79 D R 2 17.2 112-79 D R 2 17.2 112-79 D R 6 17.2 113-79 N R 6 13.5 113-79 N R 6 13.5 113-79 N R 6 13.5 113-79 N R 6 13.5 113-79 N R 6 13.5 113-79 N R 6 13.5 113-79 N R 6 13.5 113-79 N R 1 11.5 113-79 N R 1 11.5 113-79 N R 1 11.5 113-79 N R 1 11.5 113-79 N R 1 11.5 113-79 N R 1 11.5 113-79 N R 1 11.5 113-79 N R 1 11.5 113-79 N R 1 11.5 113-79 N R 1 11.5 113-79 N R 1 11.5 113-79 N R 1 11.5 113-79 N R 1 11.5 113-79 N R 1 11.5 113-79 N R 20 11.6 | -13-79 N | | • | | | 26 | | | | | | | | | | 96 | > |
| 112-79 D R 2 17.2 112-79 D R 2 17.2 112-79 D R 2 17.2 113-79 N R 2 13.5 113-79 N R 6 14.3 113-79 N R 6 14.3 113-79 N R 6 14.3 113-79 N R 6 14.3 112-79 D W 10 16.0 112-79 D W 10 16.0 112-79 D W 10 16.0 112-79 D W 20 10.0 113-79 N W 10 16.0 113-79 N W 10 16.0 113-79 N W 10 16.0 113-79 N W 10 16.0 113-79 N W 10 16.0 113-79 N W 10 16.0 113-79 N W 10 16.0 113-79 N W 10 16.0 113-79 N W 20 11.8 113-79 N W 20 11.8 113-79 N C 0 19.0 113-79 N C 0 17.5 98 113-79 N C 0 17.7 1320 31 31 1382 113822 113822 113822 11382 11382 113822 11382 11382 113822 11382 11382 11382 11382 1138 | | | | | | | | | | | | | | | | С | o |
| 19-79 D R 2 17.2 19-79 D R 6 16.2 13-79 N R 0 14.3 13-79 N R 2 13.5 13-79 N R 2 13.5 13-79 N R 6 13.5 13-79 N R 6 13.5 12-79 D W 14 11.5 12-79 D W 20 16.0 13-79 N W 14 13.0 13-79 N W 14 13.0 13-79 N W 14 13.0 13-79 N W 14 13.0 13-79 N W 14 13.0 13-79 N W 14 13.0 13-79 N W 14 13.0 13-79 N W 14 13.0 13-79 N W 14 13.0 13-79 N W 14 13.0 13-79 N W 14 13.0 13-79 N W 20 11.8 27 27 27 29 29 29 29 29 20 20 20 20 20 20 20 20 20 20 20 20 20 | -12-79 D | | | | | | ţ | | | | | | | | | 17 | C |
| 112-79 D R 4 17.2 113-79 N R 6 16.2 113-79 N R 6 143.5 113-79 N R 6 13.5 113-79 N R 11.5 112-79 D W 14 11.5 112-79 D W 14 11.5 112-79 D W 14 11.5 112-79 D W 14 11.5 112-79 D W 14 13.0 113-79 N W 18 13.0 113-79 N W 18 13.0 113-79 N W 14 13.0 113-79 N W 14 13.0 113-79 N W 14 13.0 113-79 N W 14 13.0 113-79 N W 14 13.0 113-79 N W 14 13.0 113-79 N W 14 13.0 113-79 N W 14 13.0 113-79 N C 0 21.1 4323 4323 11382 | -12-79 D | | 7 | | | | _ | | | | | | | | | <u>.</u> C | c |
| -12-79 D R 6 16.2 -13-79 N R 2 13.5 -13-79 N R 4 13.5 -13-79 N R 6 13.5 -13-79 N R 6 13.5 -12-79 D W 0 16.0 -12-79 D W 14 11.5 -12-79 D W 14 11.5 -12-79 D W 20 10.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -14-79 N C C 17.5 1920 -14-79 N C C 17.5 1920 -14-79 N C C 17.5 1920 -14-79 N C C 17.2 2723 194 -14-79 N C C 17.2 2723 194 | -12-79 D | | ۲. | | | | | | | | | | | | | o C | c |
| 13-79 N R 2 13.5 1-13-79 N R 2 13.5 1-13-79 N R 2 13.5 1-12-79 D W 0 16.0 1-12-79 D W 14 11.5 1-12-79 D W 14 11.5 1-12-79 D W 14 11.5 1-12-79 D W 14 11.5 1-12-79 D W 14 11.5 1-12-79 D W 14 11.5 1-12-79 D W 14 11.5 1-12-79 D W 14 11.5 1-12-79 D W 14 11.5 1-12-79 D W 14 11.5 1-13-79 N W 14 11.5 1-13-79 N W 14 13.0 1-13-79 N W 20 11.8 27 27 27 27 27 27 27 27 27 27 27 27 27 | -12-79 D | | 9 | | | | | | | | | | | | | o c | 435 |
| 143-79 N R | -13-79 N | | 4 (| | | | | | | | | | | | | c | 8823 |
| -13-79 N R 6 13.5 -13-79 N R 6 13.5 -12-79 D W 18 11.5 -12-79 D W 18 11.5 -12-79 D W 20 10.0 -13-79 N W 18 13.0 -13-79 N W 18 13.0 -13-79 N W 18 13.0 -13-79 N W 18 13.0 -13-79 N W 18 13.0 -13-79 N W 18 13.0 -13-79 D C 0 19.0 -13-79 D C 0 19.0 -13-79 D C 0 19.0 -13-79 D C 0 19.0 -13-79 D C 0 19.0 -13-79 D C 0 19.0 -13-79 N W 20 11.8 -13-79 N W 20 11.3 -13-79 N C 0 17.7 11320 31 31 113822 113822 113822 113822 113822 113822 113822 113822 113822 113822 113822 113822 113822 | -13-79 N | | | | | | | | | | | | | | | 0 | 15242 |
| -12-79 D W 0 16.0 -12-79 D W 14 11.5 -12-79 D W 24 11.5 -12-79 D W 24 11.5 -12-79 D W 24 11.5 -13-79 N W 24 13.0 -13-79 N W 14 13.0 -13-79 N W 20 11.8 -13-79 N W 20 11.8 -13-79 N W 20 11.8 -13-79 N W 20 11.8 -13-79 N W 20 11.8 -13-79 N W 20 11.8 -13-79 N W 20 11.8 -13-79 N W 20 11.8 -13-79 N W 20 11.8 -13-79 N W 20 11.8 -13-79 N C 0 21.1 4323 -11-79 N C 0 21.1 4323 -11-79 N C 0 21.1 2 2723 194 -11-79 N C 0 21.2 2723 194 -11-79 N C 0 21.2 2723 194 | -13-79 N -13-79 N | | | | | | | • | | | | | | | | 0 | 1515 |
| 12-79 D W 0 16.0 12-79 D W 8 11.5 12-79 D W 8 11.5 112-79 D W 14 11.5 112-79 D W 20 10.0 13-79 N W 8 13.0 13-79 N W 14 13.0 13-79 N W 14 13.0 13-79 N W 14 13.0 113-79 D C 0 19.0 110-79 D C 0 19.0 110-79 D C 0 19.0 110-79 D C 0 21.1 4323 113 11382 11-79 N C 0 21.1 4323 113-11-79 N C 0 21.1 3507 11-79 N C 0 21.1 3507 | | | ; | | | | | | | | | | | | | (| (|
| 12 | -12-79 D | | 9 | | | | | | | | | | | | | > |) |
| 12 | -12-79 D | | ; <u> </u> | | | | | | | | 18 | | | | | 48 | 0 |
| -12-79 D W 20 10.0 -13-79 N W 14 13.0 -13-79 N W 20 11.8 -10-79 D C 2 17.5 1608 -10-79 D C 4 17.5 1608 -10-79 D C 6 17.5 98 -10-79 D C 6 17.5 98 -11-79 N C 0 21.1 4323 -11-79 N C 2 17.7 11320 -11-79 N C 6 17.2 2723 194 | -12-79 D | | | | | 12 | | | | | | | | | | 12 | 0 |
| -13-79 N W 0 16.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -10-79 D C 2 17.5 1608 -10-79 D C 4 17.5 1608 -10-79 D C 6 17.5 98 -11-79 N C 0 21.1 4323 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 6 17.2 2723 194 | -12-79 D | | | | | | | | | | | | | ₹ | | 14 | 0 |
| -13-79 N W 8 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -13-79 N W 14 13.0 -10-79 D C 0 19.0 -10-79 D C 4 17.5 1608 -10-79 D C 6 17.5 98 -11-79 N C 0 21.1 4323 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 2 17.7 11320 -11-79 N C 6 17.2 2723 194 | N 62-E1- | | | | | | | | | | | | | | | 0 | 0 ; |
| -13-79 N W 14 13.0 | N 62-51- | | | | | | 27 | | | | | | | | | 27 | 28 |
| -13-79 N W 20 11.8 23 23 23 23 23 23 23 24 20 11.8 20 | N 67-61- | | | | | | | | | | | | | | | 0 | 0 |
| 0 130 | -13-79 N | | • | | | 23 | | | | | | | | | | 23 | 0 |
| 130 -10-79 D C 0 19.0 -10-79 D C 2 17.5 1608 59 131 -10-79 D C 6 17.5 98 13 -10-79 D C 6 17.5 98 4323 -11-79 N C 0 21.1 4323 31 31 11382 1 -11-79 N C 2 17.7 11320 31 31 31 3163 1 -11-79 N C 6 17.2 2723 194 2917 | | | | | | | | | | | | | | | | C | 0 |
| -10-79 D C 2 17.5 130 59 1667 1617 1667 1617 111 111 111 | -10-79 D | | | | | | | | | | | | | | | 130 | 0 |
| -10-79 D C 4 17.5 1608 59 111 -10-79 D C 6 17.5 98 133 4323 -11-79 N C 0 21.1 4320 31 31 11382 1 -11-79 N C 2 17.7 11320 31 31 3663 1 -11-79 N C 4 17.7 3507 53 103 2917 | -10-79 D | | | 060 | | | Ü | | | | | | | | | 1667 | 0 |
| -10-79 D C 6 17.5 38 133 11320 31 31 11382 1 11382 1 11382 1 1137 11320 31 31 31 31 31 31 363 1 1 1137 1137 113 | -10-79 D | | | 1608 | | | n c | | | | | | | | | - | 0 |
| -11-79 N C O 21.1 4323 31 31 11320 1 -11-79 N C 2 17.7 11320 31 31 363 1 -11-79 N C 4 17.7 3507 53 103 3663 1 -11-79 N C 6 17.2 2723 194 2917 | -10-/9 U | | • | 000 | | | 2 | | | | | | | | | 4323 | 108 |
| -11-79 N C 2 17.7 1320 31 31 31 31 363 1 3663 1 1 11-79 N C 4 17.7 3507 53 194 2917 | -11-79 N | | | • | č | | Ċ | | | | | | | | | 11382 | 15044 |
| -11-79 N C 6 17.2 2723 194 2917 | N 62-11- | | | | າ u | | - c | | | | | | | | | 3663 | 11376 |
| -11-79 N C 6 11.2 2123 134 | N 6/-11- | | | 2307 | 50 | | 3 | | | | | | | | | 2917 | 0 |
| | N 6/-11- | | • | 2 2 2 | - | | | | | | | | | | | | |

Appendix 12. Continued.

| | Sampl | O) | Paran | arameter | ers | | | | | ż | Species/Groups | /Group | ñ | | | | | | |
|--|--------|-----|------------|----------|--------------|--------|----|-----|-----|----|----------------|--------|----|----|-----|----|----------------|-----------------|---------------|
| 10 | ate | _ | a a | 0 | Temp | AL | SP | NS. | ۸۶ | 16 | 95 | GP | BR | SS | NS. | FS | Misc. | Total Larvae | 99 |
| 1 | 7-04- | 0 | 0 | | 1 | | | | | | | | | | | | | c | , c |
| 148 | - 10-7 | ء د | ے د | 0 | | 365 | | | | | | | | | | | | 365 | 0 |
| 10 | -10-7 | ۵ | ۵ | 4 | | 1414 | | | 34 | | | | | | | | | 1448 | 0 |
| 10779 N D D 8 117.2 2439 42 1178 199 191 191 191 191 191 191 191 191 19 | -10-7 | ٥ | a | 9 | • | 386 | | | 80 | | | | | | | | | 466 | 0 |
| 10-79 N D 2 18.2 2429 42 | -10-7 | ٥ | ۵ | œ | 7. | 243 | | | 19 | | | | | | | | | 262 | 0 |
| 10-79 N D 2 18.2 2429 10-79 N D 6 18.2 12429 10-79 D E 8 17.0 1288 10-79 D E 8 17.0 1289 10-79 D E 8 17.4 123 10-79 D G 8 17.4 123 10-79 D G 8 17.4 123 10-79 D G 9 17.4 123 10-79 D G 9 17.5 1289 10-79 D G 9 17.8 1289 10-79 D G 9 17.9 1289 10-79 D G 9 17.9 1289 10-79 D G 9 17.9 1289 10-79 D G 9 17.9 1289 10-79 D G 9 17.9 1289 10-79 D G 9 17.9 1289 10-79 D G 9 17.9 1289 10-79 D G 9 17.9 17.9 17.9 17.9 17.9 17.9 17.9 17 | -10-7 | z | ٥ | 0 | - | 1178 | | | | | | | | | | | | 1178 | 127 |
| 10-79 N D 6 1 18.2 12.89 42 10-79 N D 6 1 18.2 12.89 42 10-79 N D 6 1 17.0 1288 11.0 128 15.0 173 10-79 D E 6 10 10.0 173 10-79 D E 14 17.4 309 10-79 D E 14 17.4 309 10-79 D E 14 17.4 309 10-79 D E 14 17.8 2881 10-79 D G 0 20.0 13.1 45 10-79 D G 0 20.0 13.1 45 10-79 D G 0 20.0 13.1 45 10-79 D G 0 20.0 13.1 45 10-79 D G 0 20.0 13.1 45 10-79 D G 0 20.0 13.1 45 10-79 D G 0 20.0 13.1 45 10-79 D G 0 20.0 13.1 45 10-79 D G 0 20.0 13.1 43 10-79 D G 0 20.0 13.1 43 10-79 D G 0 20.0 13.1 43 10-79 D G 0 20.0 13.1 43 10-79 D G 0 20.0 13.1 43 10-79 D G 0 20.0 13.1 43 10-79 D G 0 20.0 13.1 43 10-79 D G 0 20.0 140 10-79 D G 0 | - 10-7 | z: | ۰ ۵ | ۰ 7 | | 2429 | , | | | | | | | | | > | • | 2429 | 57 |
| 10-79 N D E 18.2 1312 10-79 N D E 18.5 1312 10-79 N E 18 15.0 173 40 119 10-79 N E 18 17.4 123 76 43 119 10-79 N E 18 17.4 123 76 43 119 10-79 N E 18 17.4 123 76 43 119 10-79 N E 18 17.4 123 119 10-79 N E 18 18.5 2881 113 113 119 10-79 N G 2 18.5 2881 113 119 10-79 N G 2 18.5 2881 113 113 119 10-79 N G 1 2.7 18 290 28 18 18 18 18 18 18 18 18 18 18 18 18 18 | - 10-7 | z: | ۵ ۵ | 4 (| • | 2289 | 42 | | | | | | | | | × | x o | 2416 | 0 |
| 10-79 D E 8 15.0 | 7-01- | z | ء د | ه م | ٠ | 1312 | | | | | | | | | | | | 13.6 | 0 0 |
| -10-79 D E 0 0.0 173 40 | -101- | Z | _ | œ. | • | 1788 | | | | | | | | | | | | 9971 | > |
| 100-79 0 119 <td>-10-7</td> <td>٥</td> <td></td> <td>0</td> <td>o.</td> <td>7</td> <td></td> <td>173</td> <td>0</td> | -10-7 | ٥ | | 0 | o. | 7 | | | | | | | | | | | | 173 | 0 |
| 100-79 D E 14 15.0 100-79 D E 14 15.0 100-79 N E 0 12.0 13 2033 100-79 N E 13.4 309 76 43 2033 100-79 N E 13.4 13 214 45 100-79 D G 20.0 13 13 214 100-79 D G 18.5 2881 14 293 3306 100-79 D G 18.5 2881 14 3306 3306 3306 100-79 N G 0 20.7 3306 330 | -10-7 | ۵ | | œ | ت | 79 | | | 40 | | | | | | | | | 119 | 0 |
| 100-79 DE 20 19 19 100-79 N E 20 50 43 43 43 45 <t< td=""><td>-10-7</td><td>۵</td><td></td><td>4</td><td>ъ.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0</td><td>0</td></t<> | -10-7 | ۵ | | 4 | ъ. | | | | | | | | | | | | | 0 | 0 |
| 10-79 N E 0 20.5 2001 32 352 352 352 352 352 352 352 352 352 | -10-7 | ۵ | | 20 | ä | 19 | | | | | | | | | | | | 19 | 0 |
| 100-79 N E 17.4 309 43 352 100-79 N E 13.1 45 45 45 45 100-79 D G 2 18.5 214 214 214 100-79 D G 4 18.5 2.881 14 214 214 100-79 D G 6 17.8 290 28 3306 318 100-79 N G 6 17.1 495 3306 318 3306 318 3306 318 3306 318 3306 318 3306 318 3306 | -10-7 | z | | 0 | ö | 2001 | | | 35 | | | | | | | | | 2033 | 0 |
| 100-79 N E 14 17.4 123 76 199 110-79 N E 20 13.1 45 76 199 110-79 N G 2 18.5 218 14 2390 110-79 N G 0 22.7 3306 110-79 N G 0 22.7 3306 110-79 N G 0 22.7 3306 110-79 N G 0 22.7 3306 110-79 N G 0 1244 110-79 N G 0 1244 110-79 N G 0 1244 110-79 N G 0 1244 110-79 N G 0 1244 110-79 N G 0 1244 110-79 N G 0 1244 110-79 N G 0 1244 110-79 N G 0 1244 110-79 N G 0 128 G 0 1244 110-79 N G 0 18.8 56 110-79 N G 0 18.8 | -10-7 | z | | œ | 7 | 309 | | | 43 | | | | | | | | | 352 | 0 ; |
| 10-79 N E 20 13 14 13 13 13 13 13 14 13 13 13 14 13 14 | -10-7 | z | | 4 | 7 | 123 | | 9/ | | | | | | | | | | 199 | 4 |
| 10-79 D G 2 18.5 214 -10-79 D G 2 18.5 214 -10-79 D G 6 18.5 2248 -10-79 D G 6 18.5 2288 -10-79 D G 6 18.5 2288 -10-79 D G 6 18.5 2288 -10-79 D G 6 18.5 228 -10-79 D G 6 17.1 495 -10-79 D H G 18.8 56 -10-79 D H G 18.8 56 -10-79 D H G 18.8 56 -10-79 D H G 18.8 56 -10-79 D H G 18.8 56 -10-79 D H G 18.8 56 -10-79 D H G 18.8 56 -10-79 D H G 18.8 56 -10-79 D H G 18.8 56 -10-79 D H G 18.8 56 -10-79 D H G 18.8 56 -10-79 D H G 18.8 56 -10-79 D H G 17.5 64 -10-79 D H G 17.5 2064 | -10-7 | Z | | 50 | ເກ | 4 5 | | | | | | | | | | | | 45 | 0 |
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| 1244 10-79 D H 2 18.0 3668 10-79 D H 4 18.0 3668 10-79 D H 6 18.0 757 10-79 D H 6 18.0 757 10-79 D H 8 17.5 64 10-79 N H 2 17.5 660 30 149 10-79 N H 2 17.5 878 67 33 10-79 N H 6 17.5 2064 10-79 N H 6 17.5 2064 10-79 N H 8 16.5 993 70 1133 | - 10-7 | _ | I | c | | Z. | | | | | | | | | | | | 56 | 0 |
| -10-79 D H 4 18.0 3668 27 15 15 15 787 -10-79 D H 8 17.5 64 787 -10-79 N H 0 21.8 1767 -10-79 N H 2 17.5 660 30 149 -10-79 N H 4 17.5 878 67 33 -10-79 N H 6 17.5 2064 32 -10-79 N H 8 16.5 993 70 | -10-7 | ۵ ۵ | : I | 0 | | 1244 | | | | | | | | | | | | 1244 | 0 |
| -10-79 D H 6 18.0 757 15 15 15 787 787 787 787 787 787 787 787 787 78 | -10-7 | ۵ | I | 4 | | 3668 | | | 27 | | | | | | | | | 3692 | 0 |
| -10-79 D H 8 17.5 64 1767 1767 1767 1767 1767 1767 1767 1 | -10-7 | ۵ | I | 9 | • | 757 | | | 15 | 5 | | | | | | | | 787 | 0 |
| -10-79 N H O 21.8 1767 -10-79 N H 2 17.5 660 30 149 839 -10-79 N H 4 17.5 878 67 33 -10-79 N H 6 17.5 2064 32 -10-79 N H 8 16.5 993 70 1133 | -10-7 | ۵ | I | 8 | 7 | 64 | | | | | | | | | | | | 64 | 0 |
| -10-79 N H 2 17.5 660 30 149 839 -10-79 N H 4 17.5 878 67 33 978 -10-79 N H 6 17.5 2064 32 2096 -10-79 N H 8 16.5 993 70 1133 | -10-7 | z | I | 0 | - | 1767 | | | | | | | | | | | | 1767 | 0 |
| -10-79 N H 4 17.5 878 67 33 978 -10-79 N H 6 17.5 2064 32 2096 -10-79 N H 8 16.5 993 70 1133 | - 10-7 | z | I | 7 | 7 | 099 | 30 | | 149 | | | | | | | | | 839 | 0 |
| -10-79 N H G 17.5 2064 32 2096 -10-79 N H 8 16.5 993 70 1133 | - 10-7 | z | Į | 4 | 7 | 878 | 67 | | 33 | | | | | | | | | 978 | 0 |
| -10-79 N H 8 16.5 993 70 XP: 70 1133 | -10-7 | z | I | 9 | 7 | 2064 | | , | 32 | | | | | | | ; | | 2096 | 0 (|
| | - 10-7 | z | I | œ | 9 | 993 | | 70 | | | | | | | | × | •• | 1133 | 0 |
| | | | | | | | | | | | | | | | | | | | |

Appendix 12. Continued.

| Date D1 Sta Dpt Cmp Temp T | S | Sample | 6 | arameter | ete | S. | | | | | 3S | Species/Groups | /Group | ิ้ง | | | | | | |
|--|-----------|--------|-----|----------|----------|--------------|-------|----|----|-----|----------|----------------|--------|-----|----|----|----|-------|-----------------|------------|
| -10-79 D R 0 19.0 115 | at | ٥ | 1 S | ta D | t t | Temp | AL | SP | WS | ٩× | T | 9 | GP | BR | SS | SN | FS | Misc. | Total Larvae | Eggs |
| -10-79 D R 2 19.0 -10-79 D R 2 18.0 -10-79 D R 4 18.0 -10-79 D R 6 18.0 -11-79 N R 2 19.0 -11-79 N R 2 19.0 -11-79 N R 6 18.0 -11-79 N R 6 16.8 -10-79 D W 8 15.0 -10-79 D W 14 15.0 -10-79 D W 20 20.0 -10-79 D W 14 15.0 -10-79 D W 20 13.0 -10-79 D W 20 13.0 -10-79 D W 20 13.0 -10-79 D W 20 13.0 -10-79 D W 20 13.0 -10-79 D W 20 13.0 -10-79 N W 14 16.0 -10-79 N W 14 16.0 -10-79 N W 20 15.0 -10-79 N W 20 15.0 -10-79 N W 20 15.0 -10-79 N C 2 23.5 -10-79 N C 2 23.5 -10-79 N C 2 23.5 -10-79 N C 2 19.5 -10-79 N C 2 19.5 -10-79 N C 2 19.5 -10-79 N C 2 19.5 -10-79 N C 6 19.1 -10-79 N C 6 19.1 -10-79 N C 6 19.1 -10-79 N C 6 19.1 -10-79 N D 6 23.0 -10-79 N D 6 23.0 -10-79 N D 6 23.0 -10-79 N D 6 19.5 -10-79 N D 6 19.5 -10-79 N D 7 19.5 -10-79 N D 7 19.5 -10-79 N D 7 19.5 -10-79 N D 8 19.1 -10-79 N D 8 19.1 -10-79 N D 8 19.1 | | ١, | 1 | | 1 | 1 | | | | | | | | | | | | | | |
| -10-79 D R 4 19.0 -10-79 D R 6 18.0 -11-79 N R 2 19.0 -11-79 N R 2 19.0 -11-79 N R 2 19.0 -11-79 N R 2 19.0 -10-79 D W 8 15.0 -10-79 D W 14 15.0 -10-79 D W 20 13.0 -10-79 D C 2 23.5 -10-79 N W 14 16.0 -10-79 N W 20 15.0 -10-79 N C 2 23.5 -10-79 N C 2 23.5 -10-79 N C 2 23.5 -10-79 N C 2 23.5 -16-79 N C 2 23.5 -16-79 N C 2 23.5 -16-79 N C 2 23.0 -16-79 N C 6 19.5 -16-79 N C 70 13.0 -16-79 N C 70 13 | - 10 | ກ (| | | | | 4 | | | | | | | | | | | | <u>+</u> | oc |
| -10-79 D R 6 18.0 -11-79 N R 2 19.0 -11-79 N R 2 19.0 -11-79 N R 2 19.0 -11-79 N R 4 19.0 -10-79 D W 8 15.0 -10-79 D W 8 15.0 -10-79 D W 14 15.0 -10-79 D W 20 13.0 -10-79 D W 20 13.0 -10-79 D W 20 13.0 -10-79 D W 20 13.0 -10-79 D W 20 15.0 -10-79 D W 20 15.0 -10-79 D W 20 15.0 -10-79 N W 14 16.0 -10-79 N W 20 15.0 -08-79 D C 6 23.5 -08-79 D C 6 23.5 -16-79 N C 2 19.5 -16-79 N C 6 19.1 -16-79 N C 9 23.0 -16-79 0 | ם מ | | | | | 15.17 | | | 94 | | | | | | | | | 1611 | 0 |
| -11-79 N R 0 20.8 1181 -11-79 N R 2 19.0 7712 -11-79 N R 2 19.0 7712 -11-79 N R 2 19.0 7712 -11-79 N R 2 19.0 7712 -10-79 N R 6 16.8 8031 42 -10-79 D W 20 13.0 15 -10-79 D W 20 13.0 15 -10-79 D W 20 13.0 15 -10-79 N W 20 13.0 15 -10-79 N W 20 13.0 172 -10-79 N W 20 23.5 13 -08-79 D C 2 23.5 13 -08-79 D C 6 23.8 165 -16-79 N C 2 19.5 240 -16-79 N C 6 19.1 224 -16-79 N C 6 23.0 182 -16-79 N C 6 23.0 182 -16-79 N C 6 23.0 182 -16-79 N C 6 23.0 182 -16-79 N C 6 19.5 240 -16-79 N C 6 19.5 260 -16-79 N C 6 19.5 260 -16-79 N C 6 19.5 116 -16-79 N D 6 23.0 182 -08-79 D D 6 23.0 182 -08-79 D D 6 23.0 182 -16-79 N D 6 23.0 183 -16-79 N D 6 19.5 666 -16-79 N D 7 116 -16-79 N D 7 116 -16-79 N D 8 19.1 160 | 2 5 | nσ | | | | | 230 | | | 6 6 | | | | | | | | | 620 | 0 |
| -11-79 N R 2 19.0 7712 -11-79 N R 2 19.0 7712 -11-79 N R 4 19.0 10932 -110-79 N R 6 16.8 8031 42 -10-79 D W 8 15.0 12 -10-79 D W 14 15.0 15 -10-79 D W 20 13.0 15 -10-79 N W 8 16.0 363 -10-79 N W 14 16.0 172 -10-79 N W 20 15.0 172 -10-79 N W 20 15.0 172 -10-79 N W 20 15.0 172 -10-79 N W 20 15.0 172 -10-79 N W 20 15.0 172 -10-79 N C 2 23.5 13 -08-79 D C 6 23.8 165 -16-79 N C 2 19.5 240 -16-79 N C 6 19.1 224 -16-79 N C 6 19.1 224 -08-79 D D 2 23.0 62 -16-79 N D 2 23.0 13 -08-79 D D 4 23.0 182 -08-79 D D 6 23.0 13 -16-79 N D 7 2 19.5 116 -16-79 N D 7 2 19.5 116 -16-79 N D 8 19.1 160 | 1 - 1 - 2 | ດ | | | | | 1181 | | |) | | | | | | | | | 1181 | 809 |
| -11-79 N R 4 19.0 10932 -11-79 N R 6 16.8 8031 42 -10-79 D W 8 15.0 12 -10-79 D W 14 15.0 15 -10-79 D W 20 13.0 15 -10-79 N W 20 13.0 172 -10-79 N W 14 16.0 172 -10-79 N W 14 16.0 172 -10-79 N W 20 15.0 172 -10-79 N W 20 15.0 172 -10-79 N C 2 23.5 338 -08-79 D C 0 23.5 13 -08-79 D C 6 23.8 165 -16-79 N C 2 19.5 240 -16-79 N C 2 19.5 240 -16-79 N C 6 19.1 224 -16-79 N C 6 19.1 224 -16-79 N C 6 19.1 224 -16-79 N C 6 19.5 196 -16-79 N D 0 24.2 62 -08-79 D D 0 24.2 62 -16-79 N D 0 24.2 62 -16-79 N D 0 21.5 116 -16-79 N D 0 21.5 116 | = | 6 | | | | | 77.12 | | | 30 | | | | | | | Χ | 5: 92 | 7834 | 3733 |
| -11-79 N R 6 16.8 8031 42 -10-79 D W 0 20.0 -10-79 D W 14 15.0 -10-79 D W 20 13.0 -10-79 D W 20 13.0 -10-79 N W 20 13.0 -10-79 N W 8 16.0 -10-79 N W 14 16.0 -10-79 N W 14 16.0 -10-79 N W 20 15.0 -10-79 N W 20 15.0 -10-79 N W 20 15.0 -10-79 N W 20 15.0 -10-79 N W 20 15.0 -10-79 N C 2 23.5 -16-79 N C 0 21.0 -16-79 N C 0 21.0 -16-79 N C 0 24.2 -16-79 N C 6 19.1 -08-79 D D 0 24.2 -16-79 N D 0 24.2 -08-79 D D 0 24.2 -16-79 N D 0 24.2 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 -16-79 N D 0 21.5 | -1 | 6 | | | | | 10932 | | | 0 | | | | | | | | | 10972 | 12456 |
| -10-79 D W 0 20.0 -10-79 D W 14 15.0 -10-79 D W 14 15.0 -10-79 D W 20 13.0 -10-79 N W 8 16.0 -10-79 N W 8 16.0 -10-79 N W 14 16.0 -10-79 N W 20 15.0 -10-79 N W 20 15.0 -10-79 N W 20 15.0 -08-79 D C 2 23.5 -08-79 D C 2 23.5 -08-79 D C 2 23.5 -16-79 N C 2 19.5 -16-79 N C 2 19.5 -16-79 N C 6 19.1 -08-79 D D 2 23.0 -16-79 N C 6 19.1 -08-79 D D 2 23.0 -16-79 N C 6 19.1 -08-79 D D 2 23.0 -16-79 N D 2 21.5 -16-79 N D 6 21.5 -16-79 N D 6 19.5 -16-79 N D 8 19.1 | -1 | ၈ | | | | | 8031 | 42 | | 84 | | | | | | | | | 8157 | 25867 |
| -10-79 D W 8 15.0 -10-79 D W 14 15.0 -10-79 D W 20 13.0 -10-79 N W 20 13.0 -10-79 N W 8 16.0 -10-79 N W 14 16.0 -10-79 N W 20 15.0 -10-79 N W 20 15.0 -10-79 N W 20 15.0 -08-79 D C 0 23.5 -08-79 D C 0 23.5 -16-79 N C 0 21.0 -16-79 N C 0 24.2 -16-79 N C 6 19.1 -16-79 N C 6 23.0 -16-79 N C 6 23.0 -16-79 N C 0 24.2 -16-79 N D 0 24.2 -08-79 D D 2 23.0 -16-79 N D 0 24.2 -16-79 N D 0 24.5 -16-79 N D 0 21.5 -16-79 N D 0 0 21.5 | - 1 | 70 | c | | c | c | | | | | | | | | | | | | 0 | 0 |
| -10-79 D W 14 15.0 -10-79 D W 20 13.0 -10-79 N W 20 13.0 -10-79 N W 8 16.0 -10-79 N W 14 16.0 -10-79 N W 14 16.0 -10-79 N W 20 15.0 -08-79 D C 2 23.5 -08-79 D C 2 23.5 -08-79 D C 4 23.5 -16-79 N C 2 19.5 -16-79 N C 6 19.5 -16-79 N C 6 19.1 -08-79 D D 2 23.0 -16-79 N C 6 19.5 -16-79 N C 6 19.5 -16-79 N D 2 23.0 -16-79 N D 0 24.2 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -16-79 N D 0 24.2 -16-79 N D 0 21.5 -16-79 N D 0 0 21.5 | 1 2 | ٠, | ے د | | ο α | 2 | 12 | | | 24 | | | | | | | | | 36 | 0 |
| -10-79 D W 20 13.0 15 -10-79 N W 8 16.0 363 -10-79 N W 8 16.0 363 -10-79 N W 14 16.0 172 -10-79 N W 14 16.0 172 -10-79 N W 20 15.0 172 -08-79 D C 0 23.5 13 -08-79 D C 4 23.5 338 -08-79 D C 6 23.8 165 -16-79 N C 0 21.0 804 -16-79 N C 0 21.0 804 -16-79 N C 0 21.0 804 -16-79 N C 0 24.2 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -16-79 N D 0 21.5 116 -16-79 N D 0 21.5 116 -16-79 N D 0 21.5 116 -16-79 N D 0 21.5 116 -16-79 N D 6 19.5 66 | 1 5 | | ۵ ۵ | | 4 | . ເຄ | ! | | | 57 | | | | | | | | | 57 | 0 |
| -10-79 N W O 20.5 3215 -10-79 N W 14 16.0 172 -10-79 N W 14 16.0 172 -10-79 N W 14 16.0 172 -10-79 N W 20 15.0 -08-79 D C O 23.5 13 -08-79 D C A 23.5 338 -08-79 D C G 23.8 165 -16-79 N C O 21.0 804 -16-79 N C O 21.0 804 -16-79 N C O 24.2 -16-79 N C G 19.5 240 -16-79 N C G 19.1 224 -08-79 D D O 24.2 -08-79 D D O 24.2 -08-79 D D O 24.2 -08-79 D D O 24.2 -08-79 D D O 24.2 -16-79 N D O 21.5 116 -16-79 N D G 19.5 66 -16-79 N D G 19.5 66 -16-79 N D G 19.5 66 -16-79 N D G 19.5 66 | 9 | _ | ۵ ۵ | | 0 | С | 15 | | | | | | | | | | | | វភ | 0 |
| -10-79 N W 8 16.0 363 44 -10-79 N W 14 16.0 172 -10-79 N W 14 16.0 172 -08-79 N C 2 23.5 13 -08-79 D C 0 23.5 13 -08-79 D C 4 23.5 338 -08-79 D C 6 23.8 165 -16-79 N C 0 21.0 804 -16-79 N C 0 21.0 804 -16-79 N C 2 19.5 240 -16-79 N C 6 19.1 224 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -16-79 N D 0 21.5 116 -16-79 N D 6 19.5 66 -16-79 N D 6 19.5 66 -16-79 N D 8 19.1 160 | 9 | 7 | z | | 0 | o. | 3215 | | | 09 | | | | | | | | | 3275 | 0 |
| -10-79 N W 14 16.0 172 -10-79 N W 20 15.0 -08-79 D C 0 23.5 -08-79 D C 2 23.5 -08-79 D C 4 23.5 -08-79 D C 6 23.8 165 -16-79 N C 2 19.5 240 -16-79 N C 2 19.5 196 -16-79 N C 2 19.5 240 -16-79 N C 2 19.5 196 -16-79 N C 6 19.1 224 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -08-79 D D 6 23.0 62 -08-79 D D 6 23.0 13 -16-79 N D 0 21.5 116 -16-79 N D 6 19.5 66 -16-79 N D 6 19.5 66 -16-79 N D 6 19.5 66 | -10 | 7 | z | | 80 | ø. | 363 | | 44 | | | | | | | | | | 407 | 0 |
| -10-79 N W 20 15.0 -08-79 D C 2 23.5 -08-79 D C 2 23.5 -08-79 D C 6 23.8 -16-79 N C 2 19.5 -16-79 N C 2 19.5 -16-79 N C 2 19.5 -16-79 N C 2 19.5 -16-79 N C 2 19.5 -16-79 N C 6 19.1 2 23.0 -08-79 D D 2 23.0 -08-79 D D 2 23.0 -08-79 D D 6 23.0 -16-79 N D 2 21.5 -16-79 N D 2 21.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 | - 10 | 7 | z | | 4 | 9 | 172 | | | 80 | | | | | | | × | P: 40 | 292 | 0 |
| -08-79 D C O 23.5 -08-79 D C 2 23.5 -08-79 D C 4 23.5 -08-79 D C 6 23.8 -16-79 N C O 21.0 -16-79 N C 2 19.5 -16-79 N C 4 19.5 -16-79 N C 6 19.1 -08-79 D D O 24.2 -08-79 D D O 24.2 -08-79 D D 0 24.2 -08-79 D D 6 23.0 -08-79 D D 6 23.0 -16-79 N D 0 21.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 | - 10 | 7 | z | | Ö. | 2 | | | | | | | | | | | | | 0 | 0 |
| -08-79 D C 2 23.5 -08-79 D C 4 23.5 -08-79 D C 6 23.8 -16-79 N C 0 21.0 -16-79 N C 2 19.5 -16-79 N C 6 19.1 -16-79 N C 6 19.1 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -08-79 D D 2 23.0 -08-79 D D 6 23.0 -08-79 D D 6 23.0 -16-79 N D 6 23.0 -16-79 N D 6 19.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 | ď | 70 | _ | c | c | ď | | | | | | | | | | | | | 0 | 0 |
| -08-79 D C 4 23.5 -08-79 D C 6 23.8 -16-79 N C 0 21.0 8 -16-79 N C 2 19.5 -16-79 N C 4 19.5 -16-79 N C 6 19.1 2 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -08-79 D D 2 23.0 -08-79 D D 4 23.0 -08-79 D D 6 23.0 -08-79 D D 6 23.0 -16-79 N D 2 21.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 | 0 0 | 5 6 | 2 0 | ט כ | ٥ (| | 13 | | | | | | | | | | | | 13 | 0 |
| -08-79 D C 6 23.8 1 -16-79 N C 0 21.0 8 -16-79 N C 2 19.5 2 -16-79 N C 4 19.5 1 -16-79 N C 6 19.1 2 -08-79 D D 0 24.2 -08-79 D D 2 23.0 -08-79 D D 4 23.0 -08-79 D D 6 23.0 -08-79 D D 6 23.0 -16-79 N D 0 21.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 | -08 | 79 | ۵ ۵ | · U | 4 | | 338 | | | | | | | | | | | | 338 | 0 |
| -16-79 N C O 21.0 B -16-79 N C 2 19.5 -16-79 N C 2 19.5 -16-79 N C 4 19.5 -16-79 N C 6 19.1 2 -08-79 D D 0 24.2 -08-79 D D 2 23.0 -08-79 D D 4 23.0 -08-79 D D 6 23.0 -08-79 D D 6 23.0 -16-79 N D 0 21.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 | -08 | 13 | ۵ | ပ | 9 | ω. | 165 | | | | | | | | | | | | 165 | 0 |
| -16-79 N C 2 19.5 2 1-16-79 N C 2 19.5 2 1-16-79 N C 4 19.5 1 1-16-79 N C 6 19.1 2 1-16-79 N C 6 19.1 2 1-16-79 N D 0 2 2 1.5 1-16-79 N D 0 2 11.5 1-16-79 N D 6 19.5 | - 16 | 19 | z | ပ | 0 | - | 804 | | | | | | | | | | | | 804 | 0 |
| -16-79 N C 4 19.5 1 -16-79 N C 6 19.1 2 -08-79 D C 24.2 -08-79 D D 24.2 -08-79 D D 23.0 -08-79 D D 6 23.0 -08-79 D D 8 23.0 -16-79 N D C 21.5 -16-79 N D C 21.5 -16-79 N D C 21.5 -16-79 N D C 21.5 -16-79 N D C 21.5 -16-79 N D C 21.5 -16-79 N D C 21.5 -16-79 N D C 19.5 -16-79 N D C 19.5 | - 16 | 19 | z | ပ | 7 | ნ | 240 | | | | | | | | | | | | 240 | 0 |
| -16-79 N C 6 19.1 2 -08-79 D D 0 24.2 -08-79 D D 0 24.2 -08-79 D D 4 23.0 -08-79 D D 6 23.0 -16-79 N D 0 21.5 -16-79 N D 2 21.5 -16-79 N D 2 21.5 -16-79 N D 6 19.5 -16-79 N D 8 19.1 | - 16 | 19 | z | ပ | 4 | 6 | 196 | | | | | | | | | | | | 196 | 0 (|
| -08-79 D D 0 24.2 -08-79 D D 2 23.0 -08-79 D D 4 23.0 -08-79 D D 6 23.0 -16-79 N D 0 21.5 -16-79 N D 2 21.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 | - 16 | 79 | z | ပ | 9 | თ | 224 | | | | | | | | | | | | 224 | > |
| -08-79 D D 2 23.0 -08-79 D D 4 23.0 -08-79 D D 6 23.0 -08-79 D D 6 23.0 -16-79 N D 0 21.5 -16-79 N D 4 19.5 -16-79 N D 6 19.5 -16-79 N D 6 19.5 | -0 8 | 4 | 0 | _ | c | 4 | | | | | | | | | | | | | 0 | 0 |
| -08-79 D D 4 23.0 -08-79 D D 6 23.0 -08-79 D D 8 23.0 -16-79 N D 2 21.5 -16-79 N D 4 19.5 -16-79 N D 6 19.5 -16-79 N D 8 19.1 | -08 | 19 | ٥ | ۵ | ~ | ω. | 62 | | | | | | | | | | | | 62 | 0 |
| -08-79 D D 6 23.0 -08-79 D D 8 23.0 -16-79 N D 0 21.5 -16-79 N D 2 21.5 -16-79 N D 4 19.5 -16-79 N D 6 19.5 -16-79 N D 8 19.1 | -08 | 19 | ۵ | ٥ | 4 | е Э | 182 | | | | | | | | | | | | 182 | 0 |
| -08-79 D D 8 23.0 -16-79 N D 0 21.5 -16-79 N D 2 21.5 -16-79 N D 4 19.5 -16-79 N D 6 19.5 -16-79 N D 8 19.1 | -08 | 79 | ۵ | ۵ | 9 | ω. | 28 | | | | | | | | | | | | 28 | 0 |
| -16-79 N D O 21.5 -16-79 N D 2 21.5 -16-79 N D 4 19.5 -16-79 N D 6 19.5 -16-79 N D 8 19.1 | -08 | 79 | ۵ | ۵ | œ | ص | 13 | | | | | | | | | | | | - | 0 |
| -16-79 N D 2 21.5 1 -16-79 N D 4 19.5 -16-79 N D 6 19.5 -16-79 N D 8 19.1 | - 16 | 4 | z | ۵ | 0 | - : | 70 | | | | | | | | | | | | 70 | 0 |
| -16-79 N D 4 19.5 -16-79 N D 6 19.5 -16-79 N D 8 19.1 | - 16 | 79 | z | ۵ | 7 | _ | 116 | | | | | | | | | | | | 116 | 0 |
| -16-79 N D 6 19.5 -16-79 N D 8 19.1 | - 16 | - 62 | z | ٥ | 4 | 60 | 37 | | | | | | | | | | | | 37 | 0 (|
| -16-79 N D 8 19.1 1 | - 16 | .79 | z | ۵ | 9 | о О | 99 | | | | | | | | | | | | 99 | o (|
| | - 16 | 19 | z | ٥ | œ | 6 | 160 | | | | | | | | | | | | 160 | 0 |
| | | | | | | | | | | | | | | | | | | | | |

Appendix 12. Continued.

| Sample | a | Parameter | etei | รั | | | | | żs | Species/Groups | /Group | ŵ | | | | | | |
|---------|-----|-----------|----------|--------|----------------|-----|-----|----|----|----------------|------------|----|----|----|----|----------|-----------------|------|
| Date | 10 | Sta D | Dpt | Temp | AL | gS. | W.S | γP | 16 | 9 | a 5 | BR | SS | NS | FS | Misc. | Total Larvae | Eggs |
| 9 | 4 | | | 0 | | | | | | | | | | | | | c | |
| 7-80- | ء د | | | , < | 22 | | | | | | | | | | | | 20 | o C |
| 7-80- | ے د | | 0 4 | ٠ | 77 | | | | | | | | | | | | 0 | 0 |
| -08-7 | ۵ ۵ | | r 0 | | | | = | | | | | | | | | | = | 0 |
| - 17-7 | z | | 0 | | | | • | | | | | | | | | | 0 | 0 |
| -17-7 | z | | 8 | | 107 | | | | | | | | | | | | 101 | 0 |
| 8-17-79 | z | ш | 14 | 19.5 | | | | | | | | | | | | | 0 | 0 |
| -11-7 | z | | 0 | • | 54 | | | | | | | | | | | | 54 | 0 |
| -08-7 | | ی | | 4 | 201 | | | | | | | | | | | | 201 | 0 |
| -08-7 | ۵ | G | | | l Q | | | | | | | | | | | | 1278 | 0 |
| -08-7 | ۵ | G | | ω. | 1296 | | | | | | | | | | × | . 83 | 1379 | 0 |
| -08-7 | ۵ | g | | Θ. | 162 | | | | | | | | | | | | 162 | 0 |
| -16-7 | z | G | | 6 | 54 | | | | | | | | | | | | 54 | 0 |
| 8-16-79 | z | g | 7 | 19.7 | 289 | | 48 | | | | | | | | | | 337 | 0 |
| -16-7 | z | U | | 6 | 245 | | | | | | | | | | | | 245 | 0 |
| -16-7 | z | G | | ნ | | | | | | | | | | | | | 0 | 0 |
| -08-7 | ۵ | | | (T) | 28 | | | | | | | | | | | | 23 | 0 |
| -08-7 | ۵ | | | 7 | 1208 | | | | | | | | | | Ϋ́ | 36 | 1244 | a |
| -08-7 | ۵ | | | 6 | 84 | | | | | | | | | | | | 84 | 0 |
| -08-7 | ۵ | | | 6 | 10 | | | | | | | | | | ; | • | 70 | 0 (|
| -08-7 | : ۵ | | | ٠ ا | 126 | | | | | | | | | | × | <u> </u> | 139 | 0 (|
| - 16-7 | Z: | | | თ | 539 | | | | | | | | | | | | 536 | 0 |
| 1-91- | z 2 | | | ກ່ວ | 7/0 | | | | | | | | | | | | 206 | 0 |
| - 16-7 | Z Z | | | | 20 80 4 4 4 | | | | | | | | | | | | 84 | 0 |
| -91 | z | I | ∞ | 19.0 | 114 | | | | | | | | | | | | 114 | 0 |
| -08-7 | 0 | ~ | | | | | | | | | | | | | | | 0 | 0 |
| 8-08-79 | ۵ | ~ | 8 | 24.5 | 194 | | | | | | | | | | × | | 210 | 0 |
| -08-7 | ۵ | œ | | | 728 | | | | | | | | | | × | | 755 | 0 |
| -08-7 | ۵ | œ | | | 281 | | | | | | | | | | × | | 295 | 0 |
| - 16-7 | z | œ | | | 45 | | | | | | | | | | | | 45 | 0 (|
| -16-7 | z | œ | | | 205 | | | | | | | | | | | | 205 | 0 (|
| -16-7 | Z | œ | | | 220 | | | | | | | | | | | | 220 | 0 (|
| - 16-7 | z | œ | | | 252 | | | | | | | | | | | | 727 | 0 |
| | | | | | | | | | | | | | | | | | | |

Appendix 12. Continued.

| Date of Star Dpt C | Sample Parameter | ters | | | | | żs . | Species/Groups | Groups | ú | | | | | | |
|--|------------------|--------------|----|----|----|----|------|----------------|--------|----|----|---|----|-------|-----------------|-------------|
| 0.8-79 D W 8 10.0 18 16 16 16 16 16 16 16 16 16 16 16 16 16 | ate D1 Sta Dp | | AL | SP | SM | γp | 47 | ۵b | CP | BR | SS | S | FS | Misc. | Total Larvae | Eggs |
| 18 10 10 10 10 10 10 10 10 10 10 10 10 10 | A 0 07-00- | 22 | | | | | | | | | | | | | 0 | 0 |
| | M G 6/-80- | 10 | 18 | | | | | | | | | | | | 18 | 0 |
| -17-79 N W 20 70 -17-79 N W 8 19-7 -17-79 N W 8 19-7 -17-79 N W 8 19-7 -17-79 N W 8 19-7 -17-79 N W 20 19-7 -17-79 N C C 20-0 -17-79 N C C | W Q 62-80- | 9 | 16 | | | | | | | | | | | | 16 | 0 |
| 11779 N W B 19.7 57 11779 N W B 19.7 57 11779 N W B 19.7 54 11779 N W B 19.7 54 11779 N W C 20.0 11779 N C 2 19.5 11779 N C 2 19.5 11779 N C 2 19.5 11779 N C 2 19.5 11779 N C 2 19.5 11779 N C 2 19.5 11779 N C 2 19.5 11779 N D C 2 20.0 | W 0 61-80- | 7 | | | | | | | | | | | | | 0 | 0 |
| 117-79 N W 14 19.7 57 117-79 N W 14 19.7 54 117-79 N W 14 19.7 54 117-79 N W 14 19.7 54 117-79 N W 14 19.7 54 117-79 N C 2 19.0 0 117-79 N C 2 19.0 0 117-79 N C 2 19.0 0 117-79 N C 2 19.0 0 117-79 N C 2 19.0 0 117-79 N D 2 19.5 19.8 19.8 19.5 19.8 19.8 19.8 19.8 19.8 19.8 19.8 19.8 | W N 67-71- | 20 | | | | | | | | | | | | | 0 | 0 |
| 147-79 N W 14 19.7 54 147-79 N W 20 19.7 54 147-79 N C 0 20.0 0 147-79 N C 0 20.0 1 147-79 N C 0 20.1 38 147-79 N C 0 20.1 38 147-79 N C 0 20.1 38 147-79 N C 0 20.1 38 147-79 N C 0 20.1 38 147-79 N C 0 20.1 38 147-79 N C 0 20.1 38 147-79 N C 0 20.1 38 147-79 N C 0 20.1 38 147-79 N D 0 20.1 38 147-79 N D 0 20.1 38 147-79 N D 0 20.0 32 147-79 N D 0 20.0 38 | W N 67-71- | 19 | 57 | | | | | | | | | | | | 21 | 0 |
| -17-79 N W 20 19.7 -12-79 D C 0 20.0 -12-79 D C 0 4 19.5 -12-79 D C 0 4 19.5 -11-79 N C 2 19.6 -11-79 N C 2 19.8 -11-79 N D 0 2 19.5 -12-79 D D 0 19.7 -12-79 D D 0 19.7 -12-79 D D 0 19.7 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D 0 19 | W N 61-71- | 5 | 54 | | | | | | | | | | | | 50 44 (| 0 (|
| 112-79 D C 0 20.0 112-79 D C 0 2 19.5 117-79 N C 0 20.1 117-79 N C 0 20.1 117-79 N C 0 20.1 117-79 N C 0 20.1 117-79 N D 0 19.7 117-79 N D 0 19.5 117-79 N D 0 19.5 117-79 N D 0 19.5 117-79 N D 0 19.5 117-79 N D 0 19.5 117-79 N D 0 19.5 | W N 67-71- | 19 | | | | | | | | | | | | | > | > |
| -12-79 D C 2 19.5 | -12-79 D C | 20 | | | | | | | | | | | | | 0 | 0 |
| -12-79 D C 4 19.5 -11-79 N C 2 19.8 -11-79 N C 4 19.5 -11-79 N C 4 19.8 -11-79 N C 4 19.8 -11-79 N C 6 19.0 -12-79 D D 0 19.7 -12-79 D D 0 19.7 -12-79 D D 0 19.7 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D D 0 19.5 -12-79 D 0 19.5 -12- | -12-79 D C | 6 | | | | | | | | | | | | | 0 | 0 |
| 1-12-79 N C C 20.1 38 38 38 38 38 38 38 38 38 38 38 38 38 | -12-79 D C | 6 | | | | | | | | | | | | | 0 | 0 |
| 111-79 N C 0 20.1 38 111-79 N C 0 10.1 38 111-79 N C 0 19.1 38 111-79 N C 0 19.1 39 111-79 N C 0 19.1 34 111-79 N C 0 19.7 5 111-79 N D 0 19.7 5 111-79 N D 0 20.0 58 19.5 5 111-79 N D 0 20.0 58 19.5 5 111-79 N D 0 20.0 58 19.5 5 111-79 N D 0 20.0 58 19.5 5 111-79 N D 0 20.0 58 19.5 5 111-79 N D 0 20.0 58 19.5 5 111-79 N D 0 20.0 58 19.5 5 111-79 N D 0 20.0 58 19.5 5 111-79 N D 0 20.0 58 19.5 5 111-79 N D 0 20.0 59 111-79 N D 0 20.0 59 111-79 N D 0 20.0 59 111-79 N D 0 20.0 59 111-79 N D 0 20.0 59 111-79 N D 0 20.0 59 111-79 N D 0 20.0 59 111-79 N D 0 20.0 59 111-79 N D 0 20.0 59 111-79 N D 0 20.0 59 111-79 N D 0 20.0 59 111-79 N D 0 20.0 59 | -12-79 D C | 19 | | | | | | | | | | | | | 0 (| 0 0 |
| -11-79 N C 2 19.8 34 -11-79 N C 4 19.8 34 -11-79 N C 6 19.0 0 19.7 -12-79 D D 0 19.7 -12-79 D D 0 21.5 38 -12-79 D D 0 41.5 -12-79 D D 0 41.5 -12-79 D D 0 41.5 -12-79 D D 0 41.5 -12-79 D D 0 21.5 38 -11-79 N D 2 20.0 32 -11-79 N D 4 20.0 58 -11-79 N D 4 20.0 58 -11-79 N D 6 20.0 58 -11-79 N D 6 20.0 58 -12-79 D E 14 15.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | -11-79 N C | 20 | 38 | | | | | | | | | | | | 80 7 | > |
| -11-79 N C 4 19.8 -11-79 N C 6 19.0 -11-79 N C 6 19.0 -12-79 D D 2 19.5 -12-79 D D 6 19.5 -12-79 D D 6 19.5 -12-79 D D 8 19.5 -11-79 N D 2 20.0 -11-79 N D 4 20.0 -11-79 N D 4 20.0 -11-79 N D 5 20.0 -11-79 N D 6 20.0 -11-79 N D 6 20.0 -11-79 N D 6 20.0 -12-79 D E 0 20.0 -12-79 D E 0 20.0 -12-79 D E 0 20.0 -12-79 D E 0 20.0 -12-79 D G 0 20.0 | -11-79 N C | 19 | 34 | | | | | | | | | | | | 4 (| O |
| 112-79 N C 6 19.0 12-79 D D 0 19.7 12-79 D D 0 2 19.5 12-79 D D 0 2 19.5 12-79 D D 0 2 19.5 12-79 D D 0 2 19.5 12-79 D D 0 2 19.5 11-79 N D 0 2 19.5 11-79 N D 6 20.0 11-79 N D 6 20.0 11-79 N D 6 20.0 11-79 N D 6 20.0 11-79 N D 6 20.0 11-79 N D 6 20.0 11-79 N D 6 20.0 11-79 N D 6 20.0 11-79 N D 6 20.0 11-79 N D 6 20.0 11-79 D C 0 20.0 11-79 D C 0 20.0 11-79 N C 0 20.0 11-79 N C 0 20.0 11-79 N C 0 20.0 11-79 N C 0 20.0 11-79 N C 0 20.0 11-79 N C 0 20.0 11-79 N C 0 20.0 11-79 N C 0 20.0 11-79 N C 0 20.0 11-79 N C 0 20.0 11-79 N C 0 20.0 11-79 N C 0 20.0 11-79 N C 0 20.0 11-79 N C 0 20.0 | -11-79 N C | - | | | | | | | | | | | | | > C | 0 |
| 1-12-79 | -11-79 N C | - | | | | | | | | | | | | | • | • |
| -12-79 D D 2 19:5 -12-79 D D 6 19:5 -12-79 D D 6 19:5 -12-79 D D 6 19:5 -11-79 N D 2 20:0 32 -11-79 N D 2 20:0 33 -11-79 N D 2 20:0 32 -11-79 N D 2 20:0 32 -11-79 N D 6 20:0 38 -11-79 N D 6 20:0 38 -11-79 N D 6 20:0 39 -11-79 N D 6 20:0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 0 0 b2-14- | 6 | | | | | | | | | | | | | 0 | 0 |
| -12-79 D D 4 19.5 -12-79 D D 6 19.5 -12-79 D D 6 19.5 -11-79 N D 0 21.5 38 -11-79 N D 0 21.5 38 -11-79 N D 0 21.5 38 -11-79 N D 0 21.5 38 -11-79 N D 6 20.0 32 -11-79 N D 8 18.0 -12-79 D E 0 20.0 -12-79 D E 14 15.0 -12-79 D G 0 20.0 | -12-79 D D | 19 | | | | | | | | | | | | | 0 | 0 |
| -12-79 D D 6 19.5 -12-79 D D 8 19.5 -17-79 N D 2 20.0 -11-79 N D 2 20.0 -11-79 N D 2 20.0 -11-79 N D 6 20.0 -11-79 N D 6 20.0 -11-79 N D 6 18.0 -11-79 N D 6 18.0 -12-79 D E 14 15.0 -12-79 D E 14 15.0 -12-79 D G 0 20.0 | -12-79 D D | 19 | | | | | | | | | | | | | 0 | 0 |
| 142-79 D D 8 19.5 141-79 N D 0 21.5 38 140-90 N D 0 21.5 38 141-79 N D 6 20.0 32 141-79 N D 6 20.0 58 141-79 N D 8 18.0 58 141-79 N D 8 18.0 58 141-79 N D 8 18.0 58 141-79 D E 0 20.0 50 141-79 D G 0 20.0 50 141 | -12-79 D D | 19 | | | | | | | | | | | | | 0 | 0 (|
| 11-79 N D 0 21.5 38 40 40 40 40 40 40 40 40 40 40 40 32 40 32 40 32 40 32 40 32 40 40 40 40 40 40 40 40 40 40 40 40 40 | -12-79 D D | 19 | | | | | | | | | | | | | 0 ; | 0 (|
| 11-79 N D 2 20.0 40 11-79 N D 6 20.0 58 11-79 N D 6 40.0 58 11-79 N D 6 20.0 58 12-79 D E 8 15.0 12-79 D E 14 15.0 12-79 D E 20.0 9.0 112-79 D G 0 20.0 112-79 D 0 20.0 112-79 D 0 20.0 112-79 D 0 20.0 112-79 D 0 20.0 112-79 D 0 20.0 112-79 D 0 20.0 112-79 D 0 20.0 112-79 D 0 20.0 112-79 D 0 20.0 112-79 D 0 20.0 112-79 D 0 20.0 112-79 D 0 20.0 112-79 D 0 | -11-79 N D | 21 | 38 | | | | | | | | | | | | 38 | 0 0 |
| -11-79 N D 4 20.0 58 -11-79 N D 6 20.0 58 -11-79 N D 6 20.0 58 -11-79 N D 7 8 18.0 -12-79 D 7 8 15.0 -12-79 D 7 8 15.0 -12-79 D 7 8 15.0 -12-79 D 8 20.0 -12-79 D 8 20.0 -12-79 D 8 20.0 -12-79 D 8 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 -12-79 D 9 20.0 | -11-79 N D | 20 | 40 | | | | | | | | | | | | 04 0 | 0 |
| -11-79 N D 6 20.0 58 -11-79 N D 6 20.0 58 -11-79 N D 8 18.0 0 -12-79 D E 8 15.0 -12-79 D E 14 15.0 -12-79 D G 0 20.0 | -11-79 N D | 20 | 32 | | | | | | | | | | | | ى 2 م | O |
| -11-79 N D 8 18.0 -12-79 D E 0 20.0 -12-79 D E 14 15.0 -12-79 D G 0 20.0 -12-79 D G 2 19.5 -12-79 D G 4 19.5 -12-79 D G 6 19.5 -12-79 D G 6 19.5 -12-79 D G 6 19.5 -11-79 N G 0 20.0 -11-79 N G 2 20.0 -11-79 N G 6 19.0 | -11-79 N D | 50 | 28 | | | | | | | | | | | | 3 0 | 0 |
| -12-79 D E 0 20.0 -12-79 D E 8 15.0 -12-79 D E 14 15.0 -12-79 D E 14 15.0 -12-79 D G 0 20.0 -12-79 D G 0 20.0 -12-79 D G 0 20.0 -12-79 D G 0 20.0 -12-79 D G 0 20.0 -12-79 D G 0 4 19.5 -12-79 D G 0 4 19.5 -11-79 N G 0 20.0 -11-79 N G 0 20.0 -11-79 N G 0 20.0 -11-79 N G 0 20.0 | 0 N 8/-11- | - | | | | | | | | | | | | | | |
| -12-79 D E 8 15.0 -12-79 D E 14 15.0 -12-79 D E 14 15.0 -12-79 D G 0 20.0 -12-79 D G 0 20.0 -12-79 D G 0 20.0 -12-79 D G 6 19.5 -12-79 D G 6 19.5 -11-79 N G 0 20.0 -11-79 N G 2 20.0 -11-79 N G 4 20.0 -11-79 N G 6 19.0 | -12-79 D E | 20. | | | | | | | | | | | | | 0 | 0 |
| -12-79 D E 14 15.0 -12-79 D E 20 9.0 -12-79 D G 20.0 -12-79 D G 2 19.5 -12-79 D G 6 19.5 -12-79 D G 6 19.5 -11-79 N G 2 20.0 -11-79 N G 4 20.0 -11-79 N G 6 19.0 | -12-79 D E | 15. | | | | | | | | | | | | | 0 | 0 (|
| -12-79 D E 20 9.0 -12-79 D G 0 20.0 -12-79 D G 2 19.5 -12-79 D G 6 19.5 -12-79 D G 6 19.5 -11-79 N G 0 20.0 -11-79 N G 4 20.0 -11-79 N G 6 19.0 | -12-79 D E | 15 | | | | | | | | | | | | | 0 | 0 (|
| -12-79 D G 0 20.0 -12-79 D G 2 19.5 -12-79 D G 4 19.5 -12-79 D G 6 19.5 -11-79 N G 2 20.0 -11-79 N G 4 20.0 -11-79 N G 6 19.0 | -12-79 D E | б | | | | | | | | | | | | | 0 | 0 |
| -12-79 D G O 20.0 -12-79 D G 2 19.5 -12-79 D G 4 19.5 -17-79 D G 6 19.5 -11-79 N G 0 20.0 -11-79 N G 4 20.0 -11-79 N G 6 19.0 | | • | | | | | | | | | | | | | c | C |
| -12-79 D G 2 19.5 -12-79 D G 4 19.5 -12-79 D G 6 19.5 -11-79 N G 0 20.0 -11-79 N G 4 20.0 -11-79 N G 6 19.0 | -12-79 D G | 50. | | | | | | | | | | | | | c | c |
| -12-79 D G 4 19.5 -12-79 D G 6 19.5 -11-79 N G 0 2 20.0 -11-79 N G 4 20.0 -11-79 N G 6 19.0 | -12-79 D G | 9 | | | | | | | | | | | | | oc | C |
| -12-79 D G 6 19.5 -11-79 N G 0 20.0 -11-79 N G 4 20.0 -11-79 N G 6 19.0 | -12-79 D G | 9 | | | | | | | | | | | | | o c | C |
| -11-79 N G O 20.0 34 -11-79 N G 2 20.0 -11-79 N G 4 20.0 -11-79 N G 6 19.0 | -12-79 D G | <u>.</u> | , | | | | | | | | | | | | 7, | o c |
| -11-79 N G 2 20.0 -11-79 N G 4 20.0 -11-79 N G 6 19.0 | -11-79 N G | 20. | 34 | | | | | | | | | | | | 5 | 0 |
| -11-79 N G 4 20.0 -11-79 N G 6 19.0 | -11-79 N G | 50 | | | | | | | | | | | | | o c | O |
| -11-79 N G 6 19.0 | -11-79 N G | 20. | | | | | | | | | | | | | | 0 |
| | -11-79 N G | 6 | | | | | | | | | | | | | > | > |
| | | | | | | | | | | | | | | | | |

Appendix 12. Continued.

| Sample F | Parameters | eter | s, | | | | | ds | Species/Groups | Groups | | | | | | | |
|------------------------|------------|-------|--------------|----|----|----|----|-----|----------------|--------|----|----|----|----|-------|-----------------|------|
| Date D1 9 | Sta Dp | Dpt T | Temp C | AL | SP | SM | γÞ | 1.0 | ۵۲ | CP | BR | SS | SN | FS | Misc. | Total Larvae | Eggs |
| -12-79 | | | 19.5 | ; | | | | | | | | | | | | 0: | 0 |
| -12-79 -12-79 | | | 9.9 19.0 | 4 | | | | | | | | | | | | 4 0 | 00 |
| -12-79 | | | 0.6 | | | | | | | | | | | | | 0 0 | 0 (|
| -11-79 | | | 0.0 | | | | | | | | | | | | | | 0 |
| 9-11-79 N 9-11-79 N | II | 24 | 19.5 19.5 | 33 | | | | | | | | | | | | 33 | 00 |
| -11-79 | | | . D | | | | | | | | | | | | | 00 | 00 |
| -11- | | | . . | | | | | | | | | | | | | 0 | 0 |
| -12-79 | | | 0.6 | | | | | | | | | | | | | 0 | 0 |
| -12-79 | | | 0.6 | | | | | | | | | | | | | 0 | 0 |
| -12-79 | | | 0.6 | | | | | | | | | | | | | o c | 00 |
| -11-79 | | | 0.1 | | | | | | | | | | | | | 0 | 0 |
| 9-11-79 N | œ 0 | 0 < | 20.5 | | | | | • | | | | | | | | 00 | 00 |
| -11-79 | | | , m | | | | | | | | | | | | | 00 | 00 |
| -12-79 | | | | | | | | | | | | | | | | 0 | 0 |
| 9-12-79 D 9-12-79 D | 3 3 3 3 | | 15.0 15.0 | | | | | | | | | | | | | 00 | 00 |
| -12-79 | | | | | | | | | | | | | | | | 0 | 0 |
| -11-79 | | | | | | | | | | | | | | | | 0 | 0 |
| -11-79 | | | | | | | | | | | | | | | | 0 | 0 |
| -11-79 | | | | | | | | | | | | | | | | 0 | 0 |
| -12-79 | | | | | | | | | | | | | | | | 0 | 0 |

Appendix 13. Physical and limnological parameters measured during fish larvae field sampling in Cook Plant study areas, southeastern Lake Michigan, 1975-1979. pc. = partly cloudy; ovc. = overcast; ND = no data; var. = variable; dir. = direction. See Fig. 1 for the location of sampling stations.

| | | | Wate | r temp | (C) | Wi | ind | Wa | ves | Cur- | | Sec- |
|----------------|-------|----|--------------|--------|-------------|------|----------------|--------------|-------------------|----------------|---------|-------------|
| | Start | ٥. | | | | | | | | rent | | chi |
| Date | | | Sur- face | | Bot- tom | Dir. | Speed (mph) | Dir. from | Ht. (m) | (Dir. from) | Weather | disc (m) |
| | | | | | | | \p | | (/ | 210117 | wearner | (111) |
| 975 | • | | | | | | | | | | | |
| 15 Apr | 1708 | A | 8.3 | ND | 8.7 | s | 0-5 | W | 0.2 | ND | clear | >0.8 |
| 15 Apr | 2240 | A | 6.5 | ND | 6.5 | S | 0- 5 | W | < 0.1 | S | clear | |
| 15 Apr | 1740 | В | 7.5 | ND | 7.1 | S | 0-5 | W | < 0.1 | S | clear | >0.8 |
| 15 Apr | 2310 | В | 5.7 | ND | 5.7 | S | 0-5 | W | < 0.1 | S | clear | |
| 15 Apr | 1612 | F | 8.1 | ND | 8.1 | S | 0-5 | W | $\frac{7}{5}$ 0.1 | SE | clear | >0.8 |
| 15 Apr | 2145 | F | 6.5 | ND | 6.5 | SE | 0-5 | W | .<0.1 | s | clear | |
| 14 Apr | 1442 | Ċ | 3.0 | ND | 2.2 | S | 0-5 | | 1m | ND | ovc. | 1.3 |
| 14 Apr | 2241 | C | 1.0 | ND | 1.0 | NE | 0-5 | NW | 0.2 | , ND | ovc. | د . ۱ |
| 14 Apr | 1515 | D | 4.8 | ND | 4.7 | NW | 5-10 | NW | 0.2 | ND | ovc. | 1.7 |
| 14 Apr | 2120 | D | 1.0 | ND | 0.7 | ND | 0-5 | NW | 0.2 | ND | ovc. | 1.7 |
| 14 | | _ | | | | | | | • | | | , - |
| 14 Apr | 1621 | G | 1.9 | ND | 1.7 | NW | 0-5 | NW | 0.2 | ND | ovc. | 1.8 |
| 14 Apr | 2023 | G | 1.1 | ND | 1.1 | NE | 0-5 | NW | 0.2 | ND | ovc. | |
| 14 Apr | 1655 | H | 1.6 | ND | 1.0 | NW | 0-5 | NW | 0.2 | ND | ovc. | 1.5 |
| 14 Apr | 1942 | H | 0.5 | ND | 0.1 | NW | 5-10 | ca | | ND | ovc. | |
| 14 Apr | 1401 | R | 4.6 | ND | 3.9 | S | 0~5 | ca | lm | ND | ovc. | 1.4 |
| 14 Apr | 2321 | R | 1.4 | ND | 1.6 | ca | lm | ca | lm | ND | ovc. | |
| 16 Apr | 1855 | E | 3.6 | ND | 3.5 | var. | 0-5 | ca | lm | ND | clear | 2.2 |
| 16 Apr | 2122 | E | 3.6 | ND | 3.5 | var. | 0-5 | ca | lm | ND | clear | |
| l6 Apr | 1757 | W | 3.7 | ND | 3.5 | var. | | | < 0.1 | ND | clear | 2.0 |
| 16 Apr | 2034 | W | 3.7 | ND | 3.5 | var. | | ca | | ND | clear | |
| 13 Ma y | 1630 | Α | 12.9 | ND | 12.9 | W | 0~5 | NW | 0.2 | N | clear | 0.6 |
| 14 May | 0148 | A | 10.0 | ND | 10.0 | E | 10-15 | S | 0.6-0.9 | N | pc. | 0.0 |
| 13 May | 1707 | В | 12.0 | ND | 12.0 | W | 0-5 | NW | 0.0-0.9 | N | clear | 0.8 |
| 14 May | 0226 | В | 9.5 | ND | 9.5 | E | 10-15 | S | 0.6-0.9 | N N | pc. | 0.0 |
| 13 May | 1550 | F | 11.8 | | 11.8 | W | 0-5 | NW | 0.0-0.9 | N N | clear | 1.0 |
| · | | - | | | | •• | | •••• | | •• | | |
| 14 May | 0105 | F | 10.1 | ND | 10.1 | E | 10-15 | S | 0.6-0.9 | SE | pc. | |
| 14 May | 1356 | С | 10.0 | ND | 9.0 | ca | | ca | | ND | ovc. | 3.0 |
| 15 May | 2207 | С | 8.2 | ND | 8.2 | NE | 10-15 | NW | 0.3-0.6 | ND | clear | |
| 14 May | 1305 | D | 10.0 | ND | 8.5 | ca | | ca | | ND | ovc. | 3.0 |
| 15 May | 2124 | D | 9.0 | ND | 9.0 | NE | 10-15 | NW | 0.3-0.6 | ND | clear | |
| 14 May | 1633 | G | 9.5 | ND | 8.2 | ca | lm | ca | lm | ND | ovc. | 3.0 |
| 14 May | 2006 | G | 9.6 | ND | 8.6 | SE | 0-5 | S | < 0.1 | ND | ovc. | |
| 14 May | 1546 | н | 9.8 | ND | 8.0 | SW | 0-5 | - | lm | ND | ovc. | 3.3 |
| 14 May | | Н | 8.8 | ND | 7.8 | S | 5-10 | | <u><</u> 0.1 | ND | ovc. | |
| 14 May | 1114 | R | 8.8 | ND | 8.0 | SW | 0-5 | ca: | lm | S | pc. | 1.9 |
| 14 May | 2245 | R | 10.2 | ND | 7.6 | NE | 10-15 | NW | 0.3-0.6 | ND | clear | |
| 14 May | 1448 | | 10.2 | ND | 5.9 | ca | | cai | | ND | ovc. | 3.5 |
| 15 May | 2044 | | 10.1 | ND | 7.0 | NE | 10-15 | NW . | 0.4-0.6 | ND | clear | 2.2 |
| 28 May* | 1258 | | 17.5 | ND | 12.5 | NE | 5-10 | NW | 0.2-0.6 | NW | clear | 7.5 |
| 28 May* | 2200 | | 17.0 | ND | 13.0 | NW | 10-15 | N | 0.6 | N | clear | , , , |

Appendix 13. Continued.

| | _ | | Wate | r temp | (C) | Wi | nd | Wa | ves | Cur- | | Sec- |
|---------|------------------------|------|--------------|---------------|------|--------------|-------------|--------------|-----------------|------------------------|---------|--------------------|
| Date | Start time (EST) | Sta- | Sur- face | Mid- depth | | Dir. from | Speed (mph) | Dir. from | Ht. (m) | rent (Dir. from) | Weather | chi disc (m) |
| 75 | | | | | | | | | | | | |
| 13 May | 1559 | W | 11.5 | ND | 5.0 | ca | lm | ca | lm | ND | clear | 4.0 |
| 13 May | 1950 | W | 7.3 | ND | 4.6 | ca | lm | ca | lm | ND | clear | |
| 28 May* | 1346 | 4# | 18.5 | ND | 12.0 | NE | 5-10 | NW | 0.2 - 0.6 | NW | clear | 7.5 |
| 28 May* | 2246 | 4# | 16.0 | ND | 13.5 | NW | 10-15 | N | 0.6 | N | clear | |
| 28 May* | 1332 | 5# | 18.5 | ND | 12.0 | NE | 5-10 | NW | 0.2-0.6 | NW | clear | 7.5 |
| 28 May* | 2232 | 5# | 16.5 | ND | 13.5 | NW | 10-15 | N | 0.6 | N | clear | |
| 28 May* | 1316 | 6# | 17.8 | ND | 12.0 | NE | 5-10 | NW | 0.2-0.6 | NW | clear | 7.5 |
| 28 May* | 2220 | 6# | 16.0 | ND | 13.5 | NW | 10-15 | N | 0.6 | N | clear | |
| 10 Jun* | | Α | 16.0 | ND | 15.8 | E | 10-15 | N | 0.2 | N | clear | >2.0 |
| 23 Jun | 2225 | A | 22.5 | ND | 22.3 | E | 0-5 | S | <u><</u> 0.1 | S | ovc. | |
| 24 Jun | 1425 | Α | 24.0 | ND | 23.5 | W | 0-5 | SW | <u><</u> 0.1 | SW | ovc. | >1.5 |
| 10 Jun* | 1335 | В | 16.5 | ND | 15.0 | S | 10-15 | SE | 0.2 | SE | clear | >2.0 |
| 23 Jun | 2300 | В | 22.6 | ND | 22.5 | E | 20-25 | S | <u><</u> 0.1 | S | pc. | |
| 24 Jun | 1450 | В | 24.0 | ND | 23.5 | W | 0-5 | ca | | E | ovc. | >1.5 |
| 10 Jun* | 1631 | F | 13.8 | ND | 13.8 | SE | 10-15 | NE | <u><</u> 0.1 | NE | clear | >2.0 |
| 23 Jun | 2 122 | F | 22.9 | ND | 22.9 | E | 0-5 | S | ≤0. 1 | s | ovc. | |
| 24 Jun | 1606 | F | 23.3 | ND | 22.9 | SW | 0-5 | SW | ₹0.1 | SW | ovc. | >1.5 |
| 10 Jun | 1407 | С | 17.0 | ND | 9.2 | E | 15-20 | E | 0.2 | ND | clear | 2.5 |
| 10 Jun | 2217 | С | 15.4 | 8.6 | 8.5 | E | 10-15 | E | 0.2 | ND | clear | |
| 10 Jun | 1500 | D | 16.2 | 15.2 | 8.7 | E | 20-25 | E | 0.2 | ND | pc. | 2.3 |
| 10 Jun | 2315 | D | 14.4 | 13.5 | 8.5 | E | 10-15 | E | 0.2 | ND | ovc. | |
| 10 Jun | 1658 | G | 15.9 | | 10.5 | E | 5-10 | E | 0.2 | ND | clear | 2.0 |
| ll Jun | 0043 | G | 13.5 | 8.6 | 8.0 | E | 5-10 | E | <u><</u> 0.1 | ND | ovc. | |
| 10 Jun | 1740 | Н | 16.2 | 13.1 | 9.2 | E | 10-15 | Ε | 0.2 | ND | pc. | 2.5 |
| ll Jun | 0126 | Н | 14.5 | 8.5 | 7.9 | E | 5-10 | E | 0.2 | ND | ovc. | |
| 10 Jun | 1603 | R | 17.7 | 15.8 | 14.8 | E | 20-25 | E | 0.2 | ND | clear | 2.4 |
| 10 Jun | 2117 | R | 16.8 | 14.6 | 12.0 | E | 0-5 | E | 0.2 | ND | pc. | |
| ll Jun | 0700 | E | ND | ND | 8.3 | SE | 5-10 | SE | <0.1 | ND | pc. | |
| 18 Jun* | 1404 | E# | 21.5 | ND | 16.3 | SE | 0-5 | ca | | ND | pc. | 5.0 |
| 18 Jun* | 2132 | E# | 19.3 | ND | 16.5 | SE | 5-10 | SE | 0.2 | ND | pc. | |
| 25 Jun | 0304 | E | 19.0 | 13.0 | 8.0 | E | 0-5 | E | ≤ 0.1 | ND | ovc. | |
| 10 Jun | 1840 | W | 17.2 | 16.9 | 2.3 | E | 10-15 | E | 0.3 | ND | pc. | 5.0 |
| ll Jun | 0225 | W | 17.0 | 16.8 | 8.3 | E | 10-15 | E | 0.3-0.4 | ND | ovc. | |
| 18 Jun* | 1443 | 4# | 21.0 | ND | 18.5 | SE | 0-5 | SE | <u><</u> 0.1 | ND | pc. | 5.0 |
| 18 Jun* | 2212 | 4# | 19.5 | ND | 17.4 | SE | 5-10 | SE | 0.2 | ND | pc. | |
| 18 Jun* | 1429 | 5# | 21.0 | ND | 18.3 | SE | 0-5 | SE | <0.1 | ND | pc. | 5.0 |
| 18 Jun* | 2202 | 5# | 19.4 | ND : | 17.4 | SE | 5-10 | SE | 0.2 | ND | pc. | |
| 18 Jun* | 1418 | 6# | 21.0 | ND : | 18.3 | SE | 0-5 | SE | <u><</u> 0.1 | ND | pc. | 5.0 |
| 18 Jun* | 2148 | 6# | 19.4 | ND | 17.2 | SE | 5-10 | SE | 0.2 | ND | pc. | |
| 16 Jul | 1415 | Α | 26.4 | ND | 25.5 | ca | lm | SW | <u><</u> 0.1 | S | clear | >1.0 |
| 16 Jul | 2352 | Α | 24.6 | ND | 24.6 | SW | 5-10 | SW | 0.2 | SW | clear | |
| 16 Jul | 1500 | В | 27.7 | ND | 26.8 | W | 0-5 | E | <0.1 | E | clear | >1.0 |
| 17 Jul | 0030 | В | 24.5 | ND | 24.5 | SW | 5-10 | SW | 0.2 | SW | clear | |
| 16 Jul | 1625 | F | 26.7 | ND | 26.4 | W | 0-5 | NW | ≤0. 1 | NW | clear | >1.0 |
| 16 Ju! | 2237 | F | 24.4 | ND | 24.4 | SW | 5-10 | SW | 0.2 | SW | clear | |

Appendix 13. Continued.

| | _ | | Wate | r temp | (C) | Wi | nd | Wave | es . | Cur- | | Sec- |
|----------|-------|--------------------|--------|--------|------|--------|-------|------|-----------------|-------|----------------|-------|
| | Start | _ | _ | | | | | | | rent | | chi |
| •• | time | | Sur- | Mid- | Bot- | Dir. | Speed | Dir. | Ht. | (Dir. | | disc |
| Date | (EST) | tion | face | depth | tom | from | (mph) | from | (m) | from) | Weather | (m) |
| 75 | | | | | | | | | | | | |
| 15 Jul | 1304 | С | 23.9 | 23.7 | 23.7 | SW | 0-5 | SW | 0.3 | ND | clear | 4.2 |
| 16 Jul | 0031 | С | 22.8 | 22.5 | 22.2 | E | 10-15 | E | 0.2 | ND | clear | |
| 15 Jul , | 1441 | D | 23.7 | 23.2 | 23.2 | SW | 0-5 | SW | 0.3 | ND | clear | 4.5 |
| 15 Jul | 2338 | D | 22.7 | 22.5 | 21.7 | E | 5-10 | E | 0.2 | ND | clear | |
| 31 Jul* | 1340 | D | 24.5 | | 10.0 | N | 0-5 | NW | <u><</u> 0.1 | ND | clear | 2.0 |
| 15 Jul | 1742 | G | 23.3 | 23.1 | 22.9 | SW | 0-5 | SW | 0.2 | ND | clear | 4.0 |
| 15 Jul | 2240 | Ğ | 22.7 | | 21.9 | ca. | | E | <0.1 | ND | clear | |
| 15 Jul | 1818 | H | 23.6 | | 22.5 | SW | 0-5 | SW | 0.2 | ND | clear | 4.5 |
| 15 Jul | 2145 | H | 22.6 | 22.1 | | ca: | | cal | | ND | clear | 7.5 |
| 15 Jul; | 1351 | R | 23.4 | | 23.2 | SW Ca. | 0-5 | SW | 0.3 | ND | clear | 3 5 |
| יוחר כי | 1731 | I. | 4، د ے | 43.4 | 43.4 | 3₩ | د-0 | 3₩ | 0.3 | ND | crear | 3.5 |
| 16 Jul | 0117 | R | 22.5 | 22.4 | 22.3 | E | 10-15 | E | 0.2 | ND | clear | |
| 15 Jul | 1544 | E | 22.8 | 22.2 | ND | SW | 0-5 | SW | 0.2 | ND | clear | 7.5 |
| 16 Jul | 0211 | E | 22.0 | 21.1 | 7.7 | E | 10-15 | E | 0.2 | ND | clear | |
| 17 Ju1* | 1405 | \mathbf{E}^{μ} | 24.5 | ND | 11.4 | ca] | | cal | | ND | clear | 7.5 |
| 17 Jul* | 2337 | E# | 22.0 | ND | ND | SE | 15-20 | SE | 0.3 | ND | clear | |
| 15 Jul | 1645 | W | 23.2 | 22.0 | ND | SW | 0-5 | SW | 0.2 | ND | clear | 7.1 |
| 15 Jul | 2114 | W | 22.3 | 21.3 | | ca. | | cal | | ND | clear | / • I |
| 17 Jul* | 1444 | 41 | 24.0 | ND | 11.4 | ca. | | cal | | ND | clear | 5.0 |
| 18 Jul* | 0036 | 4# | 22.3 | ND | 11.4 | SE | 15-20 | SE | 0.2 | ND | | 5.0 |
| 17 Jul* | 1432 | 5# | 25.2 | ND | 11.4 | ca] | | cal | | ND | clear clear | 5.0 |
| 10 1 14 | 0000 | | | ••• | | | | | | | | |
| 18 Jul* | 0022 | 5 <i>‡i</i> | 21.4 | ND | 11.4 | SE | 15-20 | SE | 0.2 | ND | clear | |
| 17 Jul* | 1422 | 6# | 24.5 | ND | 11.4 | cal | | cal | | ND | clear | 5.0 |
| 17 Jul* | 2355 | 6# | 22.5 | ND | 11.4 | SE | 15-20 | SE | 0.2 | ND | clear | |
| ll Aug | 1445 | Α | 22.9 | ND | 22.9 | cal | | NW | 0.2 | ND | clear | >1.0 |
| 12 Aug | 2225 | A | 23.0 | ND | 23.0 | S | 10-15 | SW | 0.3 | S | clear | |
| ll Aug | 1530 | В | 23.5 | ND | 23.5 | cal | .m | NW | 0.2 | ND | clear | >1.0 |
| 12 Aug | 2304 | В | ND | ND | 24.0 | S | 10-15 | SW | 0.3 | S | clear | |
| ll Aug | 1620 | F | 23.5 | ND | 23.5 | NW | 0-5 | cal | m | N | ovc. | >2.0 |
| 13 Aug | 0004 | F | ND | ND | 23.0 | S | 10-15 | SW | 0.3 | SW | clear | |
| 12 Aug | 1501 | С | 24.4 | 23.0 | 23.0 | SW | 5-10 | var. | 0.2 | ND | ovc. | 2.5 |
| 12 Aug | 2255 | С | 23.5 | 22.0 | 21.5 | SE | 10-15 | var. | 0.2 | ND | clear | |
| 12 Aug | 1415 | D | 23.4 | 23.0 | 20.5 | SW | 5-10 | var. | 0.3 | ND | ovc. | 2.7 |
| 12 Aug | 2342 | D | 23.3 | 23.3 | 17.7 | SE | 10-15 | var. | 0.4-0.6 | ND | ovc. | |
| 12 Aug | 1748 | G | 24.0 | 22.6 | 22.5 | SW | 5-10 | var. | <0.1 | ND | clear | 3.0 |
| 12 Aug | 2159 | G | 23.8 | 23.4 | | SE | 10-15 | var. | | ND | clear | |
| 12 Aug | 1824 | н | 23.8 | 23.0 | 20.5 | SW | 0-5 | cal | m | ND | clear | 3.0 |
| 12 Aug | 2108 | | 23.8 | 22.9 | | SE | 10-15 | var. | | ND | clear | |
| 12 Aug | 1320 | R | 25.1 | 23.5 | | SW | 5-10 | var. | | ND | ovc. | 2.7 |
| 13 Aug | 0038 | R | 24.2 | 22.3 | | SE | 10-15 | | 0.8-0.9 | ND | ovc. | |
| 12 Aug | 1600 | | 23.0 | 9.9 | | SW | 0-5 | SW | 0-5 | ND | clear | 3.0 |
| 13 Aug | 0134 | E | 22.5 | 9.9 | NTO | SE | 15-20 | ver | 0.9-1.0 | ND | pc. | |
| 12 Aug | 1659 | | 24.0 | 9.2 | | SW | 0-5 | cal | | ND | clear | 3.1 |
| 12 Aug | 2041 | w | 24.0 | 9.2 | | SW | 0-5 | var. | | ND | clear | ٠. ١ |
| 9 Sep | 1410 | Ā | 20.5 | | 19.2 | NE | 0-5 | | 0.3 | NE | clear | 1.0 |
| , | | •• | ر . ب | | 47.4 | *** | · · | • | 0.5 | | | 1.0 |

Appendix 13. Continued.

| | C+ | | Wate | r temp | (C) | W | ind | Wav | ves | Cur- rent | | Sec- chi |
|--------|------|--------|------|---------------|------|--------------|-------------|--------------|------------|--------------|--------------|-------------|
| Date | | | | Mid- depth | | Dir. from | Speed (mph) | Dir. from | Ht. (m) | (Dir. from) | Weather | disc (m) |
| 975 | | | | | | | | | | | | |
| 9 Sep | 1508 | В | 21.0 | ND | 20.8 | NE | 0-5 | w | 0.3 | NE | clear | >1.0 |
| 10 Sep | 0010 | В | 18.9 | ND | 18.9 | cal | | ca. | | N | clear | |
| 9 Sep | 1555 | F | 19.8 | ND | 19.8 | NE | 0-5 | W | 0.3 | NE | clear | >1.0 |
| 9 Sep | 2323 | F | 18.9 | ND | 18.9 | ca | | ca] | l m | N | clear | |
| 9 Sep | 1150 | c | 21.0 | | 19.0 | NE | 0-5 | NW | 0.2 | ND | clear | 4.0 |
| ll Sep | 0100 | С | 19.2 | 19.0 | 18.4 | E | 10-15 | SE | 0.3 | ND | clear | |
| 10 Sep | 1432 | D | 20.0 | | 18.5 | S | 5-10 | SW | 0.2 | ND | clear | 3.0 |
| 10 Sep | 2350 | D | 19.2 | | 19.0 | SE | 10-15 | SE | 0.2 | ND | clear | |
| 10 Sep | 1830 | G | 19.9 | | 19.3 | SE | 5-10 | S | <0.1 | ND | clear | 3.9 |
| 10 Sep | 2048 | G | 19.8 | | 19.0 | SE | 5-10 | SE | 0.2 | ND | clear | |
| 10 Sep | 1733 | н | 20.0 | 19.0 | 19.0 | s | 0-5 | SW | 0.2 | ND | clear | 4.0 |
| 10 Sep | 1951 | H | 19.5 | | 18.9 | SE | 5-10 | SE | 0.2 | ND | clear | |
| 10 Sep | 1337 | R | 19.8 | | 19.0 | SW | 0-5 | SW | 0.2 | ND | clear | 2.9 |
| ll Sep | 0150 | R | 19.8 | | 19.2 | E | 10-15 | SE . | 0.3 | ND | clear | |
| 10 Sep | 1536 | E | 19.8 | | 18.8 | SW | 5-10 | SW | 0.2 | ND | clear | 4.0 |
| 10 Sep | 2235 | E | 18.8 | 18.4 | 18.4 | SE | 10-15 | SE | 0.2 | ND | clear | |
| 10 Sep | 1640 | W | 19.2 | | 13.1 | SW | 0-5 | SW | 0.3 | ND | clear | 4.0 |
| 10 Sep | 2145 | W | 19.0 | | 18.8 | SE | 10-15 | SE | 0.3 | ND | clear | |
| 14 Oct | 1740 | Α | 17.8 | ND | 17.8 | SE | 10-15 | S | 0.3 | ND | clear | 0.8 |
| 13 Oct | 2321 | A | 16.5 | ND | 16.5 | S | 5-10 | S | 0.3 | ND | clear | |
| 14 Oct | 1710 | В | 18.5 | ND. | 18.8 | SE | 5-10 | SW | 0.3 | ND | clear | 0.8 |
| 13 Oct | 2357 | В | 16.3 | ND | 16.3 | S | 5-10 | S | 0.3 | ND | clear | |
| 14 Oct | 1600 | F | 16.2 | ND | 16.2 | S | 10-15 | SW | 0.6 | ND | clear | 0.8 |
| 13 Oct | 2201 | F | 17.5 | ND | 17.5 | S | 5-10 | S | 0.3 | ND | clear | |
| 14 Oct | 1549 | С | 15.9 | ND | 15.9 | SW | 10-15 | S | 0.3 | ND | clear | 4.0 |
| 16 Oct | 2208 | С | 15.0 | 14.7 | 14.7 | E | 5-10 | E | 0.3 | ND | clear | |
| 14 Oct | 1647 | D | 15.4 | ND | 15.7 | SW | 15-20 | S | 0.3-0.6 | ND | clear | 4.0 |
| 16 Oct | 2250 | D | 14.8 | 14.8 | 14.8 | NE | 10-15 | E | 0.6 | ND | clear | |
| 16 Oct | 1650 | G | 15.1 | ND | 15.1 | N | 5-10 | W | 0.9 | ND | pc. | 3.0 |
| 17 Oct | 0052 | G | 14.7 | 14.5 | 14.5 | NE | 5-10 | E | 0.6 | ND | clear | |
| 16 Oct | 1650 | н | 15.4 | | 15.3 | N | 5-10 | W | 0.9 | ND | clear | 3.6 |
| 17 Oct | 0006 | н | 14.8 | | 14.8 | NE | 10-15 | E | 0.6 | ND | clear | _ |
| 14 Oct | 1510 | R | 15.8 | ND | 15.6 | S | 5-10 | S | 0.3 | ND | clear | 3.9 |
| 16 Oct | 2125 | R | 15.0 | | 14.7 | E | 0-5 | NW | 0.3 | ND | clear | _ |
| 16 Oct | 1833 | E | 14.3 | 14.2 | 14.2 | N | 5-10 | N | 0.6 | ND | clear | 6.6 |
| 17 Oct | 0250 | E | 14.0 | | 14.0 | NE | 15-20 | E | 0.9-1.5 | ND | clear | |
| 16 Oct | 1740 | W | 14.3 | ND | 14.5 | N | 5-10 | N | 0.9 | ND | clear | 6.6 |
| 17 Oct | 0147 | W | 14.0 | | 14.0 | NE | 15-20 | E | | ND | clear | |
| 4 Nov | 1438 | Α | 14.0 | ND | 14.0 | NW | 0-5 | ca] | | E | ovc. | >1.0 |
| 4 Nov | 2310 | Α | 13.4 | ND | 13.5 | cal | lm | ca] | Lm | NE | clear | , |
| 4 Nov | 1510 | В | 15.0 | ND | 14.1 | NW | 0-5 | W | | NE | ovc. | >1.0 |
| 4 Nov | 2340 | В | 13.5 | ND | 13.4 | ca. | | | lm | E | clear | |
| 4 Nov | 1604 | F | 13.9 | ND | 14.1 | NW | 0-5 | W | _ | 0 | ovc. | >1.0 |
| 4 Nov | 2215 | F C | 13.9 | ND | 13.9 | W | | cal cal | lm m | O ND | pc. clear | 5.0 |
| 6 Nov | 1412 | U | 13.2 | ND | 12.4 | Cal. | lm | Call | - 141 | 110 | C1601 | ٠.٠ |

Appendix 13. Continued.

| | C+ | | Wate | r temp | (C) | w | ind | Wa | ves | Cur- | | Sec- |
|------------------|--------------|--------|--------------|---------------|------|--------------|-------------------|--|-----------------|----------------------------|------------|--------------------|
| Date | | | Sur- face | Mid- depth | | Dir. from | Speed (mph) | Dir. from | Ht. | rent (Dir. from) | Weather | chi disc (m) |
| 975 | | | | | | | | ************************************** | | ggWagnadellog generalister | | |
| 5 Nov | 2218 | С | 12.9 | 12.2 | 11.6 | SE | 0-5 | ca | lm | ND | clear | |
| 6 Nov | 1447 | D | 13.0 | | 12.4 | S | 0-5 | | lm | ND | clear | 5.5 |
| 5 Nov | 2124 | D | 13.2 | 12.2 | 11.9 | N | 0-5 | ca | .lm | ND | clear | |
| 6 Nov | 1626 | G | 12.8 | ND | 12.2 | SW | 5-10 | SW | 0.3 | ND | ovc. | 5.0 |
| 5 Nov | 2022 | G | 13.4 | 12.2 | 12.4 | N | 0-5 | ca | lm . | ND | clear | |
| 6 Nov | 1543 | н | 12.9 | 12.3 | 12.3 | SW | 10-15 | SW | 0.2-0.3 | ND | ovc. | 5.0 |
| 5 Nov | 1931 | н | 12.9 | 12.2 | 12.2 | N | 0-5 | | lm | ND | clear | |
| 6 Nov | 1327 | R | 13.0 | | 12.8 | ca | | | lm | ND | clear | 5.0 |
| 5 Nov | 2300 | R | 12.9 | | 12.1 | SE | 0-5 | E | ≤ 0.1 | ND | clear | |
| 6 Nov | 1240 | E | 13.8 | ND | 11.0 | W | 0-5 | ca | lm | ND | clear | 5.8 |
| 5 Nov | 2353 | E | 11.8 | | 11.2 | E | 0-5 | ca | | ND | clear | |
| 6 Nov | 1706 | W | 12.1 | 11.5 | 11.5 | SW | 0-5 | SW | <u><</u> 0.1 | ND | ovc. | ND |
| 976 | | | | | | | | | | | | |
| 26 Feb | 1410 | Α | 7.5 | ND | 7.5 | W | 5-10 | W | 0.2-0.3 | N | clear | 0.4 |
| 26 Feb | 2240 | Α | 4.7 | ND | 4.7 | S | 5-10 | SW | <0.1 | S | pc. | ' |
| 26 Feb | 1513 | В | 6.2 | ND | 6.2 | W | 5-10 | W | 0.2-0.3 | N | clear | 0.4 |
| 26 Feb | 2330 | В | 5.9 | ND | 5.9 | S | 5-10 | SW | <0.1 | S | pc. | |
| 12 Apr | 1800 | Α | 10.1 | ND | 10.3 | N | 0-5 | NW | 0.3 | E | clear | 0.4 |
| 13 Apr | 0219 | Α | 7.9 | ND | 7.9 | var. | 0-5 | ND | ND | E | ND | |
| 12 Apr | 1832 | В | 9.5 | ND | 9.5 | N N | 0-5 | NW | 0.3 | Ē | clear | 0.4 |
| 13 Apr | 0252 | В | 7.0 | ND | 7.0 | var. | 0-5 | ND | ND | Ē | ND | 0.4 |
| 12 Apr | 1700 | F | 10.3 | ND | 10.3 | N | 0-5 | NW | 0.3 | Ē | clear | 0.4 |
| 13 Apr | 0128 | F | 7.9 | ND | 7.9 | var. | 0-5 | ND | ND | E | ND | |
| l4 Apr | 1400 | С | 9.5 | 9.0 | 8.2 | S | 0-5 | S | 0.2 | ND | clear | 1.8 |
| 14 Apr | 0027 | c | 8.5 | 8.5 | 8.5 | SE | 5 - 10 | SE | 0.2 | ND | clear | 1.0 |
| 14 Apr | 1527 | D | 12.4 | 8.4 | 7.7 | S | 0-5 | S | <0.1 | ND | clear | 1.8 |
| 14 Apr | 0113 | D | 7.8 | 7.6 | 7.4 | SE | 0-5 | SE | 0.2 | ND | clear | |
| 14 Apr | 1636 | G | 9.7 | ND | 9.5 | S | 10-20 | S | 0.3 | ND | pc. | 1.5 |
| 13 Apr | 2040 | G | 9.6 | 8.1 | 7.8 | SE | 0-5 | ca. | 1 m | ND | clear | |
| 14 Apr | 1719 | H | 9.0 | 9.0 | 9.0 | S | 15-20 | S | 0.9 | ND | pc. | 1.6 |
| 13 Apr | 2126 | H | 9.0 | 8.3 | 7.6 | SE | 0-5 | SE | ≤ 0.1 | ND | clear | 1.0 |
| 14 Apr | 1444 | R | 9.2 | 8.6 | 8.6 | S. | 0-5 | S | <0.1 | ND | clear | 1.8 |
| 14 Apr | 0210 | R | 8.2 | 8.2 | 8.2 | SE | 5-10 | SE | 0.2 | ND | clear | |
| 14 Apr | 1903 | E | 7.2 | 6.1 | ND | S | 5-10 | s | 0.4-0.6 | ND | pc. | 2.2 |
| 14 Apr | 2318 | E | 7.0 | 6.5 | | SE | 0-5 | SE | 0.4-0.6 | ND | clear | 4.4 |
| 14 Apr | 1820 | W | 8.5 | | 5.7 | S | 5 - 10 | S | 0.6 | ND | ovc. | 1.8 |
| 14 Apr | 2228 | W | 7.3 | 6.5 | | SE | 0-5 | SE | 0.2 | ND | clear | |
| 10 May | 1500 | A | 17.5 | ND | 17.0 | SW | 5-10 | ND | ND | S | clear | >1.0 |
| 12 Mass | 1.600 | _ | 13.1 | 12.2 | 11 5 | 277 | E 10 | 277.7 | 0.3 | MD | a1 | , , |
| 12 May 14 May | 1400 0028 | C C | 12.2 | 12.3 12.0 | | nw Sw | 5-10 10-15 | NW SW | 0.3 0.2 | ND ND | clear | 1.5 |
| 12 May | 1305 | D | 12.5 | 11.2 | | NW | 5-10 | NW | 0.3 | ND | clear | 1.8 |
| 13 May | 2333 | D | 12.0 | 11.8 | | S | 10-15 | SE | 0.2 | ND | ovc., rain | |
| 12 May | 1019 | G | 13.0 | 12.5 | | NW | 0-5 | NW | 0.3 | ND | clear | 1.5 |
| 13 May | 2229 | G | 11.5 | 11.5 | 11.5 | SE | 10-15 | SE | 0.2 | ND | ovc. | |
| 12 May | 0922 | H | 12.0 | 11.5 | | NW | 5-10 | NW | 0.3 | ND | clear | 1.5 |
| 13 May | 2129 | | 11.3 | 11.1 | | SE | 10-15 | SE | 0.2 | ND | ovc. | |
| 12 May | 1455 | | 13.5 | 2.0 | | NW | 5-10 | NW | 0.3 | ND | pc. | 1.5 |
| 14 May | 0107 | R | 11.6 | 11.6 | 11.8 | S | 0-5 | SW | 0.2 | ND | ovc., fog | |

Appendix 13. Continued.

| | | | Wate | r temp | (C) | W | ind | War | ves | Cur- | | Sec- |
|----------------|-----------------|--------|--------------|---------------|--------------|--------------|-------------------------------|--------------|-----------------|------------------------|---------------------|--------------------|
| Date | | Sta- | | Mid- depth | | Dir. from | Speed (mph) | Dir. from | Ht. (m) | rent (Dir. from) | Weather | chi disc (m) |
| 976 | • | | | | | | | | | | | |
| 12 Ma | ıy 1211 | E | 12.3 | | 9.7 | NW | 5-10 | NW | 0.3 | ND | clear | 2.0 |
| 13 Ma 12 Ma | • | E W | 10.2 10.7 | 10.0 9.8 | | SE NW | 5-10 5-10 | SE NW | 0.2-0.3 | ND ND | ovc., rain clear | 2.7 |
| 13 Ma 14 Ju | • | W A | 11.0 24.5 | 11.0 ND | 11.0 23.5 | SE S | 5-10 0-5 | SE W | 0.2 0.2 | ND SE | ovc., rain clear | 0.8 |
| 14 Ju | | A | 21.5 | ND | 21.5 | S | 5-10 | ca: | | S | pc. | 0.0 |
| 14 Ju | | B B | 24.0 21.5 | ND ND | 23.0 21.5 | S S | 0 - 5 5 - 10 | W cai | 0.2 | O S | clear pc. | 0.8 |
| 14 Ju 14 Ju | | F | 23.0 | ND | 21.8 | S | 0-5 | W Ca. | 0.2 | ND | clear | 0.8 |
| 14 Ju | | F | 21.3 | | 21.4 | S | 5-10 | ca | lm | S | pc. | |
| 22 Ju | in 1723 | С | 20.9 | 21.0 | 14.5 | SE | 5-10 | SW | 0.3 | S | ovc., rain | 2.9 |
| 17 Ju | | D | 20.5 | | 19.2 | N | 0-5 | ca. | | ND | clear | 2.0 |
| 22 Ju | | D | 21.0 | | 14.5 | S | 0-5 | S | 0.3 | ND | ovc. | 2.5 |
| 22 Ju 21 Ju | | D G | 19.0 19.5 | | 9.9 18.7 | E NW | 0-5 0-5 | E var. | 0.3 0.3 | ND N | clear pc. | 3.0 |
| 21 Ju | ın 2250 | G | 18.5 | | 15.2 | var. | 0-5 | var. | 0.2 | ND | clear | |
| 21 Ju | | H | 19.2 | | 10.5 | NW | 0-5 | var. | 0.3 | ND | pc. | 2.5 |
| 21 Ju | | H | 18.1 | | 10.0 | NW | 0-5 0-5 | var. NW | 0.3 0.3 | ND S | clear ovc., rain | 3.0 |
| 22 Ju 22 Ju | | R R | 18.5 20.0 | ND | 12.0 ND | SE S | 10-15 | S | 0.6 | ND | ovc. | 5.0 |
| 22 Ju | ın 205 5 | E | 17.5 | | 14.4 | SE | 0-5 | S | 0.6 | ND | pc. | |
| 21 Ju | | W | 19.5 | | 17.5 | NW | 5-10 | NW | 0.4 | ND | clear | 6.0 |
| 21 Ju | | W | 19.4 | | 18.5 | NW | 5-10 | NW | 0.3 0.2-0.3 | ND E | clear | 0.2 |
| 13 Ju 13 Ju | | A A | 20.3 18.0 | ND ND | 20.3 18.0 | NW E | 0-5 5-10 | NW E | 0.2 | SE | clear clear | 0.2 |
| 13 Ju | 11 1455 | В | 20.5 | ND | 20.5 | NW | 0-5 | NW | 0.2-0.3 | E | clear | 0.2 |
| 13 Ju | | В | 19.0 | ND | 19.0 | E | 5-10 | E | 0.2 | SE | clear | • |
| 13 Ju | | F | 22.0 | ND | 22.0 | NW | 0-5 | NM | 0.2-0.3 | NE | clear | 0.2 |
| 13 Ju 15 Ju | | F C | 21.0 24.7 | ND 23.8 | 21.0 23.6 | E SW | 5-10 5-10 | E W | 0.2 0.2 | SE ND | clear clear | 1.7 |
| 13 Ju | | С | 19.5 | | 17.3 | SE | 0-5 | NW | 0.3 | S | clear | |
| 15 Ju | | D | 24.4 | | 22.5 | SW | 0-5 | ca | | ND | clear | 1.7 |
| 13 Ji | | D | 19.1 | 17.8 24.1 | 17.3 | SE SW | 0-5 0-5 | NW | _<0.1 1m | s nd | clear clear | 1.8 |
| 15 Ju 14 Ju | | G G | 25.1 21.0 | | 20.5 | SE | 10-15 | SE | 0.3 | ND | clear | |
| 15 Ju | | н | 23.1 | | 21.9 | SW | 0-5 | SW | <u><</u> 0.1 | ND | ovc. | 2.6 |
| 17 Ju | | H | 22.3 | | 22.3 | SW | 5 - 10 | W | 0.2 | ND | clear | 1.7 |
| 15 Ju | | R | 23.6 | | 22.4 | SW SE | 0-5 0-10 | W S | 0.2 <0.1 | ND ND | clear clear | 1.7 |
| 14 Ju 15 Ju | | R E | 18.8 21.1 | 20.2 | 17.1 ND | S | 0-10 | SW | 0.2 | ND | pc. | 3.0 |
| 17 Ju | | E | 21.6 | 21.0 | | SW | 5-10 | W | 0.3 | ND | clear | , - |
| 15 Ju | | W | 21.8 | 20.9 | | SW | 5-10 | SW | 0.2 | ND | pc. | 4.3 |
| 17 Ju | | W | 21.6 | | 21.2 | SW | 5-10 | W | 0.2 | ND | clear | |
| 30 Ji 17 Ji | | N 4 | 25.0 22.6 | 24.0 | 24.0 NTD | SE SE | 0-5 0-5 | W W | 0.2 0.3 | ND ND | clear clear | 2.0 |
| , J | 105/ | | 0 | | | 32 | . . | ** | 0.5 | | | 0 |

Appendix 13. Continued.

| | | | Wate | r temp | (C) | W | ind | War | ves | Cur- | | Sec- |
|---------|------------------------|------------|--------------|---------------|-------------|--------------|--------------|--------------|-----------------|------------------------|-------------|--------------------|
| Date | Start time (EST) | Sta- | Sur- face | Mid- depth | Bot- tom | Dir. from | Speed (mph) | Dir. from | Ht. (m) | rent (Dir. from) | Weather | chi disc (m) |
| 976 | | | | | | | | | | | | |
| 17 Jul* | 1923 | 5 | 22.5 | 22 0 | 21.8 | SE | 0-5 | W | 0.3 | ND | clear | 2.0 |
| 17 Jul* | 2004 | 6 | 22.2 | | 21.5 | SW | 5-10 | W | 0.3 | ND | clear | |
| 9 Aug | | A | 24.5 | ND | 24.5 | W | 0-5 | ca | | NE | clear | >1.0 |
| 10 Aug | 2045 | A | 23.0 | ND | 23.0 | E | 0-5 | E | 0.2 | E | clear | |
| 9 Aug | 1515 | В | 24.3 | ND | 24.1 | W | 0-5 | ca | | N | clear | >1.0 |
| 10 Aug | 2130 | В | 22.0 | ND | 22.0 | E | 0-5 | E | 0.2 | E | clear | |
| 9 Aug | 1620 | F | 24.0 | ND | 23.3 | W | 0-5 | ca | lm | N | clear | >1.0 |
| 10 Aug | 2235 | F | 22.0 | ND | 22.0 | E | 0-5 | E | 0.2 | N | clear | |
| 10 Aug | ,1520 | C | ND | | 22.2 | S | 0-5 | S | 0.3 | ND | clear | 3.6 |
| 10 Aug | 2340 | С | 21.0 | | 20.6 | E | 0-5 | SW | 0.3 | ND | clear | |
| 10 Aug | 1430 | D | 22.5 | 22.2 | 22.2 | S | 0-5 | SW | 0.3 | ND | clear | 3.9 |
| ll Aug | 0020 | D | 21.5 | | 21.4 | E | 0-5 | S | 0.3 | ND | clear | |
| 10 Aug | 1646 | Ğ | 22.2 | | 21.2 | SE | 5-10 | S | 0.3 | ND | clear | 5.0 |
| 10 Aug | 2034 | G | 21.6 | 21.5 | 21.4 | SE | 0-5 | SW | 0.4 | ND | clear | |
| 10 Aug | 1730 | Н | 22.0 | | 21.8 | SE | 0~5 | SW | 0.3 | ND | clear | 4.0 |
| 10 Aug | 2114 | н | 21.1 | 21.0 | 21.0 | SE | 0-5 | SW | 0.3-0.4 | ND | clear | |
| 10 Aug | 1515 | R | 23.2 | 23.0 | 22.8 | SE | 5-10 | SW | 0.3 | ND | clear | 4.0 |
| 10 Aug | 2232 | R | 21.8 | 22.2 | ND | E | 0-5 | SW | 0.3 | ND | clear | |
| 10 Aug | 1010 | E | 21.5 | 20.8 | 15.4 | S | 10-15 | S | 0.3 | ND | pc. | 3.8 |
| 10 Aug | 2110 | E | 21.5 | 20.8 | 15.4 | N | 5-10 | S | <u><</u> 0.1 | ND | ND | |
| 10 Aug | 1647 | W | 21.5 | 19.5 | 15.9 | S | 10-15 | S | 0.6 | ND | clear | 4.6 |
| 10 Aug | 2035 | W | 21.5 | 19.5 | 15.9 | S | 5-10 | S | 0.3 | ND | clear | |
| 8 Aug* | 0806 | N | 21.5 | ND | 21.0 | SW | 10-15 | SW | 0.6 | ND | clear | 4.0 |
| 10 Aug* | 1606 | N | 22.5 | ND | 22.0 | SE | 5-10 | SW | 0.3-0.4 | ND | clear | 3.0 |
| 10 Aug* | 2319 | N | 21.2 | 21.2 | 21.2 | E | 0- 5 | SW | 0.3 | ND | clear | |
| 10 Aug* | 1347 | 4 | 24.0 | | 21.0 | S | 10-15 | s | 0.4 | ND | clear | 3.6 |
| ll Aug* | 0113 | 4 | 21.0 | | 21.0 | SE | 5-10 | S | 0.3 | ND | clear | 2.0 |
| 10 Aug* | 1147 | 5 | 21.8 | | 18.5 | S | 10-15 | SW | 0.3 | ND | clear | 3.8 |
| 11 Aug* | 0205 | 5 | 21.1 | 21.1 | | SE | 5-10 | S | 0.6 | ND | clear ND | 3.9 |
| 10 Aug* | 1056 | 6 | 21.3 | 19.2 | 16.7 | E | 10-15 | SE | 0.3 | ND | , UND | 3.9 |
| 10 Aug* | 2151 | 6 | 21.3 | 19.2 | 16.7 | N | 5-10 | S | ρ.3 | ND | ND | |
| 13 Sep | 1530 | A | ND | ND | 22.0 | SW | 0-5 | SW | 0.3 | SW | clear | 0.8 |
| 14 Sep | 0045 | A | ND | ND | 20.0 | SW | 10-15 | SW | 0.6-0.9 | S | clear | |
| 13 Sep* | | A# | ND | ND | 22.0 | SW | 0-5 | SW | 0.3 | SW | clear | 0.8 |
| 14 Sep* | | A# | ND | ND | 20.0 | SW | 10-15 | SW | 0.6-0.9 | S | clear | |
| 13 Sep | 1630 | В | ND | ND | 22.0 | SW | 0-5 | SW | 0.3 | S | clear | 0.8 |
| 14 Sep | 0143 | В | ND | ND | 19.9 | SW | 10-15 | SW | 0.6-0.9 | S | clear | • • |
| 13 Sep* | 1645 | B# | ND | ND | 22.0 | SW | 0-5 | SW | 0.3 | SW | clear | 0.8 |
| 14 Sep* | 0143 | B # | ND | ND | 19.9 | SW | 10-15 | SW | 0.6-0.9 | S | clear | 0.8 |
| 13 Sep | 1800 | F | ND | ND | 21.7 | SW | 0-5 | SW | 0.3 | SW | clear | 0.8 |
| 14 Sep | 0345 | F | ND | ND | 19.5 | SW | 10-15 | SW | 0.6-0.9 | S | clear | 0.8 |
| 13 Sep* | 1800 | F# | ND | ND | 19.5 | SW | 0-5 | SW | 0.3 | SW | clear | 0.0 |
| 14 Sep* | | F# | ND | ND | 19.5 | SW | 10-15 | SW | 0.6-0.9 | S | clear | 2.8 |
| 14 Sep | 1447 | C | 22.0 | | 20.0 | SW | 0-5 15-20 | SW NW | 0.3 0.3-0.6 | N ND | pc. ovc. | 4.0 |
| 14 Sep | 2345 | С | 20.2 | ND | 19.6 | NW | 1 5-20 | '4 M | 5.5-0.0 | 110 | ···· | |

Appendix 13. Continued.

| | _ | | Wate | r temp | (C) | W | ind | Wa | ves | Cur- | | Sec- |
|----------|------------------------|------------|--------------|--------|------|--------------|-------------------|--------------|-----------------|------------------------|-------------|--------------------|
| Date | Start time (EST) | Sta- | Sur- face | | Bot- | Dir. from | Speed (mph) | Dir. from | Ht. | rent (Dir. from) | Weather | chi disc (m) |
| 76 | | | | | | • | | | | | | |
| 14 Sep* | 1535 | C# | ND | ND | 18.0 | ND | ND | ND | ND | ND | pc. | 2.8 |
| 14 Sep* | 2215 | C# | 20.5 | ND | 19.7 | SW | 0-5 | SW | 0.2 | ND | clear | |
| 14 Sep | 1538 | D | 21.5 | | 19.8 | SW | 0-5 | SW | 0.3 | N | pc. | 3.8 |
| 14 Sep | 2112 | D | 19.5 | | 18.5 | NE | 0– 5 | SW | 0.2 | S | ovc. | |
| 14 Sep* | 1547 | D# | 18.0 | ND | 18.0 | ND | ND | ND | ND | ND | pc. | 3.8 |
| 14 Sep* | 2200 | D# | 20.2 | ND | 19.6 | SW | 0-5 | SW | 0.2 | ND | clear | |
| 14 Sep | 1636 | G | 21.5 | | 20.5 | SW | 0- 5 | SW | 0.3 | S | pc. | 3.2 |
| 14 Sep | 2000 | G | 20.5 | | 19.5 | var. | 0- 5 | SW | 0.2 | S | ovc., rain | |
| 14 Sep | 1720 | H | 21.0 | | 19.5 | N | 0-5 | SW | 0.3 | S | ovc., rain | 3.0 |
| 14 Sep ; | 1908 | H | 20.5 | 20.0 | 18.5 | N | 5-10 | SW | 0.3 | S | ovc. | |
| 14 Sep | 1405 | R | 20.5 | | 20.2 | SW , | 0-5 | SW | 0.3-0.6 | N | clear | 2.0 |
| 29 Sep | 2145 | R | 20.0 | | 18.9 | SE | 0-5 | SW | 0.3 | S | clear | |
| 14 Sep* | 1522 | N# | 22.1 | ND | 21.2 | ND | ND | ND | ND | ND | pc. | ND |
| 14 Sep* | 2240 | N# | 18.0 | ND | ND | SW | 0-5 | SW | 0.2 | ND | calm | |
| 14 Sep* | 1602 | P# | 22.0 | ND | 21.5 | ND | ND | ND | ND | ND | pc. | ND |
| 14 Sep* | 2300 | P# | 18.0 | ND | ND | SW | 0-5 | sw | 0.2 | ND | calm | |
| 11 Oct | 1510 | Α | 16.3 | ND | 16.3 | S | 5-10 | SW | 0.2-0.3 | S | clear | >1.0 |
| 12 Oct | 0035 | Α | 13.9 | ND | 13.5 | SW | 5-10 | SW | 0.3-0.4 | S | pc. | |
| 11 Oct* | 1515 | A# | 16.3 | ND | 16.3 | S | 5-10 | SW | 0.2-0.3 | S | clear | >1.0 |
| 12 Oct* | 0035 | A# | 13.9 | ND | 13.5 | SW | 5-10 | SW | 0.3-0.4 | S . | pc. | |
| ll Oct | 1555 | В | 15.5 | ND | 15.5 | s | 5-10 | SW | 0.2-0.3 | SE | clear | >1.5 |
| 12 Oct | 0105 | В | 13.5 | ND | 13.5 | SW | 5 - 10 | SW | 0.3-0.4 | S | pc. | |
| 11 Oct* | 1555 | В# | 15.5 | ND | 15.5 | S - | 5-10 | SW | 0.2-0.3 | SE | clear | 1.0 |
| 12 Oct* | 0105 | B# | 13.5 | ND | 13.5 | SW | 5-10 | SW | 0.3-0.4 | S | pc. | |
| 11 Oct | 1655 | F | 15.0 | ND | 15.0 | S | 5-10 | SW | 0.2-0.3 | SE | clear | 0.5 |
| ll Oct | 2330 | F | 14.0 | ND | 14.0 | sw | 5-10 | SW | 0.3-0.4 | S | pc. | |
| 11 Oct* | 1655 | F# | 15.0 | ND | 15.0 | S | 5-10 | SW | 0.2-0.3 | SE | clear | 0.5 |
| 11 Oct* | 2330 | F# | 14.0 | ND | 14.0 | SW | 5-10 | SW | 0.3-0.4 | S | pc. | |
| 19 Oct* | 1645 | C | 13.3 | | 12.5 | E | 0-5 | E | ≤ 0.1 | E | ovc., rain | ND |
| 19 Oct* | 2145 | С | 13.2 | 13.0 | 12.9 | E | 0-5 | E | 0.2 | ND | ovc., fog | |
| 12 Oct* | 2100 | C# | 16.2 | ND | 15.9 | SW | 10-15 | SW | 0.3 | ND | pc. | |
| 19 Oct* | 1735 | D | 13.1 | | 12.5 | E | 0-5 | E | 0.2 | E | ovc., rain | 2.0 |
| 19 Oct* | 2050 | D | 13.1 | 12.7 | | E | 0- 5 | E | 0.2 | ND | ovc., fog | |
| 12 Oct* | 2045 | D# | 17.4 | ND | 16.3 | SW | 10-15 | SW | 0.3 | ND | pc. | |
| 19 Oct* | 1855 | G | 13.4 | 13.0 | 12.9 | E | 0-5 | E | 0.2 | ND | ovc., rain | |
| 19 Oct* | 1940 | Н | 13.3 | 13.2 | | SE | 0-5 | E | 0.2 | ND | ovc., rain | |
| 19 Oct* | 1555 | R | 14.5 | 14.1 | | E | 0-5 | E | <u><</u> 0.1 | E | ovc., rain | 1.9 |
| 19 Oct* | 2240 | R | 14.3 | 13.5 | | E | 0-5 | E | 0.2 | ND | ovc., fog | |
| 12 Oct* | 2130 | N# | 15.8 | ND | 15.8 | SW | 10-15 | SW | 0.3 | ND | pc. | |
| 12 Oct* | 2140 | P # | 16.0 | ND | 16.0 | SW | 10-15 | SW | 0.3 | ND | pc. | |
| 8 Nov | 1635 | A | ND | ND | 6.0 | SE | 0-5 | NW | 0.6-0.9 | N | clear | 0.5 |
| 8 Nov | 2008 | A | ND | ND | 5.0 | S | 0-5 | W | 0.6-0.9 | S | pc. | |
| 8 Nov | 1650 | В | ND | ND | 6.5 | SE | 0-5 | NW | 0.6-0.9 | N | clear | ND |
| 8 Nov | 2030 | В | ND | ND | 5.0 | S | 5-10 | SE | 0.6-0.9 | N | ND | ۰. |
| 8 Nov | 1730 | F | ND | ND | 5.5 | S | 0 - 5 | NW NU | 0.6-0.9 | N N | pc. | 0.5 |
| 8 Nov | 1750 | F | ND | ND | 5.5 | S | 0-5 | NW | 0.6-0.9 | N | pc. | |

Appendix 13. Continued.

| | | | Wate | er temp | (C) | W | ind | Wa | ves | Cur- | | Sec- |
|----------------|------------------------|------------|------|---------------|------|--------------|----------------|--------------|-----------------|------------------------|---------|--------------------|
| Date | Start time (EST) | | | Mid- depth | Bot- | Dir. from | Speed (mph) | Dir. from | Ht. (m) | rent (Dir. from) | Weather | chi disc (m) |
| 77 | | | | | | | | | | | | |
| 11 Apr | 1540 | A | 13.8 | ND | 13.5 | SW | 5-10 | SW | <u><</u> 0.1 | S | clear | 0.8 |
| ll Apr | 2305 | A | 11.2 | ND | 10.8 | SW | 5-10 | W | 0.4 | N | clear | |
| ll Apr | 1610 | В | 13.5 | ND | 13.5 | SW | 5-10 | SW | <u><</u> 0.1 | S | clear | 0.8 |
| ll Apr | 2338 | В | 10.5 | ND | 10.5 | SW | 5-10 | W | 0.4 | N | clear | |
| ll Apr | 1735 | F | 12.2 | ND | 12.2 | SW | 5-10 | SW | <u><</u> 0.1 | S | clear | 0.8 |
| 11 Apr | 2358 | F | 10.8 | ND | 10.8 | SW | 5-10 | w | 0.4 | N | clear | |
| 17 Apr | 1530 | C | 12.7 | | 10.7 | ca. | | cal | | ND | clear | 4.0 |
| 17 Apr | 2150 | C | 10.8 | 9.8 | 9.6 | SE | 10-15 | SW | 0.2 | ND | clear | , , |
| 17 Apr : | | | 12.2 | 9.6 | 9.3 | ca. | | ca] | | ND | clear | 4.3 |
| 17 Apr | 2105 | D | 10.9 | 10.4 | 9.4 | SE | 5-10 | cal | .m | ND | clear | |
| 17 Apr | 1754 | G | 13.2 | 10.6 | 9.8 | ca: | | cal | | ND | clear | 3.8 |
| 17 Apr | 1927 | | 12.5 | | 10.0 | ca: | | cal | | ND | clear | |
| 17 Apr | 1712 | | 11.6 | 10.2 | 9.6 | ca. | | cal | | ND | clear | 3.6 |
| 17 Apr | 2001 | | 13.8 | 9.8 | 8.8 | S | 0-5 | cal | | ND | clear | |
| 17 Apr | 1454 | R | 11.6 | 10.8 | 10.6 | cal | Lm | cal | .m | ND | clear | 3.3 |
| 17 Apr | 2232 | R | 10.6 | 10.6 | 10.2 | SE | 10-15 | SW | 0.2 | ND | clear | |
| 17 May | 1200 | | 17.0 | ND | 16.5 | S | 0-5 | cal | | SE | clear | >1.0 |
| 17 May | 2203 | | 17.5 | ND | 17.9 | S | 0-10 | SW | 0.2 | S | pc. | |
| 17 May | 1230 | | 16.8 | ND | 16.2 | S | 0-5 | cal | m | SW | clear | >1.0 |
| 17 May | 2214 | В | 17.5 | ND | 17.1 | S | 0-10 | cal | m | S | pc. | |
| 17 M ay | 1325 | F | 18.1 | ND | 18.1 | S | 0-5 | c a l | m | s | clear | >1.0 |
| 17 May | 2230 | | 17.0 | ND | 17.0 | S | 0-10 | cal | | E | pc. | |
| 18 May | 1540 | | 19.0 | 16.0 | | cal | | cal | | N | clear | 21.0 |
| 19 May | 2336 | С | 17.8 | 15.4 | 15.0 | S | 0-5 | cal | m | ND | clear | |
| 19 May | 1000 | D | 18.7 | 17.7 | 16.7 | SW | 0-5 | SW | <u><</u> 0.1 | ND | clear | 4.0 |
| 19 Ma y | 1116 | G | 17.2 | 17.7 | 19.5 | SW | 5-10 | SW | 0.2 | ND | clear | 5.5 |
| 19 May | 1155 | н | 20.0 | 18.0 | | SW | 0-5 | SW | <0.1 | ND | clear | 5.5 |
| 18 May | 1530 | R | 18.5 | 17.0 | 17.0 | cal | m. | cal | m | N | clear | >1.0 |
| 19 May | 2249 | | 16.8 | 15.7 | | E | 5-10 | cal | | ND | clear | |
| 17 May | 1933 | E | 13.0 | 11.0 | 10.5 | SW | 5-10 | SW | 0.2-0.3 | ND | pc. | 7.0 |
| 17 May | 2133 | E | 12.0 | 11.5 | 10.5 | var. | 0-5 | SW | 0.2-0.3 | ND | pc. | |
| 19 May | 1316 | | 16.5 | 15.2 | | SW | 0-5 | cal | | ND | clear | 6.0 |
| 19 May | 2033 | | 13.5 | 12.0 | | var. | 0-5 | SW | 0.2 | ND | pc. | - |
| 13 Jun | 1605 | | 15.4 | ND | 15.4 | N | 5-10 | NW | 0.2 | N | pc. | ND |
| 13 Jun | 2340 | A . | ND | ND | 14.2 | NE | 0-5 | NW | 0.3 | N | pc. | |
| 13 Jun | 1535 | В | 15.4 | ND | 15.6 | N | 5-10 | NW | 0.2 | N | pc. | ND |
| 13 Jun | 2310 | | ND | ND | 14.5 | NE | 0-5 | NW | 0.3 | N | pc. | |
| 13 Jun | 1700 | | 15.5 | | 15.5 | N | 5-10 | NW | 0.2 | N | pc. | ND |
| 14 Jun | 0040 | | ND | ND | 14.2 | NE | 0-5 | NW | 0.3 | N | pc. | |
| 16 Jun | 1840 | | 18.5 | 16.5 | | cal | | cal | | ND | clear | 5.0 |
| 16 Jun | 0137 | С | 15.0 | 15.0 | 14.5 | cal | m | cal | m | N | clear | |
| 15 Jun | 1620 | | 16.0 | 15.0 | | NW | 5-10 | NW | 0.3 | N | clear | 4.5 |
| 16 Jun | 0040 | | 15.0 | 14.7 | | SE | 0-5 | NW | <0.1 | N | clear | |
| 15 Jun | 1900 | | 16.5 | 16.0 | | NW | 0-5 | NW | 0.3 | N | clear | 4.5 |
| 15 Jun | 2332 | | 16.0 | 15.5 | | N | 5-10 | cal | | N | clear | |

Appendix 13. Continued.

| | | | Wate | r temp | (C) | W: | ind | Wav | es | Cur- | | Sec- |
|--------------------|--|--------|--------------|---------------|-------------|--------------|----------------|--------------|-----------------|------------------------|---------------|--------------------|
| Date | Start time (EST) | | Sur- face | Mid- depth | Bot- tom | Dir. from | Speed (mph) | Dir. from | Ht. | rent (Dir. from) | ·Weather | chi disc (m) |
| 977 | ······································ | | | | | · | | | | | | |
| 16 Jun | 1958 | н | 8.5 | | 17.0 | cal | | calı | | ND | clear | 6.5 |
| 15 Jun | 2234 | H | 16.0 | 15.0 | | SE | 0-5 | SE | 0.2 | N | clear | |
| 15 Jun | 1536 | R | 17.0 | 15.5 | | NW | 5-10 | NW | 0.3 | N | clear | 4.5 |
| 16 Jun | 0225 | R | 16.0 | 15.2 | | cal | | calı | | N | clear | |
| 14 Jun | 1700 | E | 15.8 | 15.1 | 12.1 | ND | ND | ND | ND | ND | ND | 6.0 |
| 15 Jun | 2107 | E | 15.5 | 15.5 | | NW | 0 - 5 | NW | 0.2 | N | clear | 4.0 |
| 14 Jun | 1617 | W | 15.2 | 15.1 | | ND | ND 0-5 | ND NW | ND | ND | ND | 6.0 |
| 15 Jun | 2002 | W | 16.5 | 14.5 | | NW | | | 0.2 | N | clear | 1 2 |
| 12 Jul . 12 Jul | 1320 | A | 22.0 22.5 | ND ND | 22.3 | SW | 5-10 5-10 | W 1- | 0.4 | S | pc. | 1.3 |
| 12 Jui | 2225 | A | 22.5 | מא | 22.5 | S | 5-10 | calı | 1 | S | clear | |
| 12 Jul | 1235 | В | 20.3 | ND | 20.5 | SW | 5-10 | W | 0.4 | S | pc. | 1.3 |
| 12 Jul | 2200 | В | 23.0 | ND | 23.0 | S | 5-10 | calr | n | S | clear | |
| 12 Jul | 1430 | F | 23.1 | ND | 23.0 | SW | 5-10 | W | 0.4 | S | pc. | 1.3 |
| 12 Jul | 2325 | F | 20.0 | ND | 20.0 | S | 5-10 | calr | | S | clear | |
| 12 Jul | 1329 | С | 21.7 | 21.0 | 21.0 | var. | 0-5 | SW | 0.6 | ND | clear | 4.5 |
| 27 Jul | 2030 | С | ND | ND | ND | N | 0-5 | calı | | ND | clear | |
| 12 Jul | 1404 | D | 22.3 | 20.2 | | var. | 0-5 | | 0.3-0.6 | ND | pc. | 4.6 |
| 27 Jul | 2115 | D | ND | ND | ND | N | 0-5 | cal | | ND | clear | |
| 12 Jul | 1505 | G | 21.9 | 21.2 | | var. | 0-5 | S . | 0.3 | ND | clear | 6.0 |
| 27 Jul | 2230 | G | ND | ND | ND | N | 0-5 | cal | n | ND | clear | |
| 12 Jul | 1537 | H | 21.8 | 20.3 | | SE | 5-10 | | 3-0.6 | ND | clear | 6.8 |
| 27 Jul | 2305 | | ND | | ND | N | 0-5 | cal | | ND | -clear | |
| 12 Jul | 1244 | R | 20.7 | 20.3 | | SE | 0-5 | SW | 0.3 | ND | pc. | 5.2 |
| 27 Jul | 1955 | R | ND | | ND | N | 0-5 | cal | | ND | clear | |
| 12 Jul | 1726 | E | 21.0 | 19.7 | 16.4 | S | 5-10 | S | 0.2 | ND | clear | 7.7 |
| 28 Jul | 0110 | E | ND | ND | ND | SE | 0-5 | SW | <0.1 | ND | ND | |
| 12 Jul | 1633 | W | 21.3 | 19.8 | 12.7 | SE | 5-10 | s c | 3-0.6 | ND | clear | 7.5 |
| 28 Jul | 0010 | W | ND | | ND | E | 0-5 | cal | מ | ND | clear | |
| 9 Aug | 1520 | Α | 23.2 | | 23.2 | SE | 10-15 | S | <u><</u> 0.1 | ND | ovc. | >1.0 |
| 10 Aug | 2310 | A | 23.2 | ND | 23.2 | E | 0-5 | cal | n . | ND | clear | |
| 9 Aug | 1555 | В | 23.0 | | 23.0 | | 10-15 | s | <u><</u> 0.1 | ND | ovc. | -1.0 |
| 10 Aug | 2235 | В | 23.3 | | 23.0 | E | 0-5 | cal | | 0 | clear | _ |
| 9 Aug | 1735 | F | 22.5 | | 22.5 | SE | 10-15 | S | <u><</u> 0.1 | ND | ovc. | >1.0 |
| 10 Aug | 2144 | F | 24.3 | | 23.7 | E | 0-5 | cal | | N | clear | *** |
| 9 Aug | 1751 | С | ND | ND | ND | E | 5-10 | SE | 0.2 | E | ovc., rain | ND |
| 10 Aug | 2117 | С | 23.2 | 21.9 | | S | 0-5 | calm | | ND | clear | |
| 9 Aug | 1714 | D | 21.5 | | ND 5 | SE | 0 - 5 | SE | 0.2 | ND | ovc. | 5.8 |
| 10 Aug | 2154 | | 22.5 | 22.0 | | SE | 0-5 | SE | <u><</u> 0.1 | ND | clear | 310 |
| 9 Aug 10 Aug | 1217 2252 | G G | 22.2 24.0 | 21.8 ND | ND | S S | 10-15 0-5 | SE calu | 0.3 | ND ND | ovc. clear | ND |
| 9 Aug | 1139 | н | ND | ND | ND | SE | 5-10 | SE | 0.2 | ND | ovc. | 4.8 |
| 10 Aug | 2333 | | 23.5 | 22.5 | | SE | 0-5 | SE | <0.1 | ND | clear | →.0 |
| 9 Aug | 1641 | | ND | | ND | ND | ND | calm | | E | ovc. | ND |
| 10 Aug | 2033 | | 23.8 | | ND | SE | 0-5 | calt | | ND | clear | |
| 9 Aug | 1409 | | 21.2 | 9.0 | 8.3 | SE | 5-10 | SE | 0.2 | ND | ovc., rain | 7.0 |

Appendix 13. Continued.

| | a | | Wate | r temp | (C) | W | ind | Wa | ves | Cur- | | Sec- |
|----------------|----------|------------|---|---------------|-------|--------------|-----------------|--------------|---------|------------------|--|--------------------|
| Date | | | Sur- face | Mid- depth | | Dir. from | Speed (mph) | Dir. from | Ht. | rent (Dir. from) | Weather | chi disc (m) |
| 977 | | | *************************************** | | | | . 17 | | | | Orabiylik soon ol maalaatiin oo siirilik ahaan oo saadahka | |
| ll Aug | 0127 | E | 22.5 | | 19.5 | W | 0~5 | W | 0.2 | ND | clear | |
| 9 Aug | 1331 | W | 21.9 | 8.2 | | S | 5-10 | SE | 0.2 | E | ovc. | 7.0 |
| 11 Aug | 0028 | W | 23.2 | | 14.9 | SW | 0-5 | | lm | ND | clear | , - |
| 12 Sep | 1515 | A | 18.5 | | 18.5 | SE | 10-15 | S | 0.9 | S | ovc., rain | 1.5 |
| 12 Sep | 2135 | A | 18.0 | ND | 18.5 | SE | 5-10 | SE | 0.2 | ND | ovc., rain | |
| 12 Sep | 1440 | В | 18.3 | | 18.3 | SE | 10~15 | S | 0.9 | S | ovc., rain | 1.5 |
| 12 Sep | 2105 | В | 18.0 | ND | 17.9 | SE | 5-10 | SE | 0.2 | ND | ovc., rain | |
| 12 Sep | 1610 | F | 19.0 | | 19.0 | SE | 10-15 | S | 0.9 | S | ovc., rain | 1.5 |
| 12 Sep | 2240 | F | 18.4 | ND | 18.1 | SE | 5-10 | SE | 0.2 | ND | ovc., rain | |
| 13 Sep | 1400 | С | 19.5 | 19.5 | 19.5 | NE | 10-15 | N | 0.3 | ND | ovc., rain | 2.5 |
| 15 Sep | 2004 | С | 10.0 | | 10.0 | E | 15-20 | E | 0.2 | ND | ovc., rain | |
| 13 Sep | 1323 | D | 19.2 | | 19.0 | NE | 10-15 | N | 0.3 | ND | ovc., rain | 3.0 |
| 15 Sep | 2045 | D | 10.0 | | 10.0 | E | 15-20 | E | 0.3 | ND | ovc. | |
| 13 Sep | 1521 | G | 19.5 | | 19.9 | N | 10-15 | N | 0.6 | ND | ovc., rain | 3.0 |
| 15 Se p | 2151 | G | 9.5 | 9.0 | 9.0 | E | 15-20 | E | 0.3 | ND | ovc. | |
| 13 Sep | 1446 | Н | 19.5 | | 20.0 | NE | 5-10 | N | 0.4 | ND | ovc., rain | 2.5 |
| 15 Sep | 2226 | H | 9.5 | 9.5 | | E | 15-20 | E | 0.3 | ND | ovc. | |
| 13 Se p | 1250 | R | 20.0 | | 19.5 | N | 10-15 | N | 0.3 | ND | ovc., rain | 3.0 |
| 15 Sep | 1923 | R | 10.0 | | 10.0 | E | 15-20 | E | 0.3 | ND | ovc., rain | |
| 13 Sep | 1702 | E | 19.0 | 19.0 | 19.0 | NE | 10-15 | NE | 0.6-0.9 | ND | ovc. | 2.5 |
| 13 Se p | 1610 | . W | 19.1 | 18.8 | .13.0 | NE | 10-15 | N | 0.6 | ND | ovc. | 3.5 |
| 10 Oct | 1600 | Α | 13.9 | ND | 13.9 | SE | 10-15 | SW | 0.6 | S | pc. | >1.0 |
| 10 Oct | 2325 | A | 11.7 | ND | 11.7 | SE | 15-20 | SW | 0.6 | S | ovc. | |
| 10 Oct | 1530 | В | 13.0 | ND | 13.0 | SW | 10-15 | SW | 0.6 | S | pc. | >1.0 |
| 10 Oct | 2250 | В | 12.7 | ND | 12.7 | SE | 15-20 | W | 0.6 | S | ovc. | |
| 10 Oct | 1655 | F | 13.3 | ND | 13.3 | SW | 10-15 | SW | 0.6 | s | pc. | >1.0 |
| 10 Oct | 2155 | F | 12.5 | ND | 12.5 | SE | 15-20 | SE | 0.6 | S | ovc. | |
| 8 Nov | 1414 | Α | 11.8 | ND | 11.8 | ca | | ca | | E | ovc., fog | >1.0 |
| 8 Nov | 2150 | Α | 11.7 | ND | 11.7 | | lm | ca | | NC | ovc. | |
| 8 Nov | 1337 | В | 11.4 | ND | 11.2 | ca | lm | ca | lm | E | ovc., fog | >1.0 |
| 8 Nov | 2120 | В | 11.3 | ND | 11.4 | | lm | ca | | ND | ovc. | |
| 8 Nov | 1527 | F | 11.9 | ND | 11.7 | N | 0-5 | W | 0.2 | S | ovc., fog | >1.0 |
| 8 Nov | 2014 | F | 7.9 | ND | 7.9 | ca | lm | ca | lm | ND | ovc. | |
| 78 | | | | | | | | | | | | |
| ll Apr | 1153 | С | 3.9 | 3.9 | 3.9 | SW | 10-15 | SW | 0.6-0.9 | S | pc. | 2.0 |
| 27 Apr | 2054 | С | 9.5 | 6.0 | 6.0 | NE | 0-5 | NE | 0.2 | ND | clear | |
| ll Apr | 1250 | D | 3.5 | 3.5 | 3.5 | SW | 10-15 | SW | 0.9 | ND | pc. | 2.8 |
| 27 Apr | 2120 | D | 8.0 | 7.0 | 6.0 | NE | 0-5 | NE | 0.2 | ND | clear | , . |
| 11 Apr | 1545 | G | 4.3 | 4.3 | 4.3 | SW | 15-20 | S | 0.9 | ND | ovc. | 1.5 |
| 27 Apr | 2208 | G | 9.0 | 6.5 | 6.5 | NE | 0-5 | NE | 0.2 | ND | clear | , , |
| ll Apr | 1511 | H | 4.1 | 4.1 | 4.1 | SW | 15-20 | S | 0.9 | ND | ovc. | 1.6 |
| 27 Apr | 2232 | H | 9.0 | 6.5 | 6.5 | NE | 0-5 | NE | 0.2 | ND | clear | 2.8 |
| 11 Apr | 1110 | R | 3.2 | 3.2 | 3.2 | SW | 10-15 | SW | 0.6 | ND | pc. | 4.8 |
| 27 Apr | 2026 | R | 9.5 | 7.0 | 7.0 | NE | 0-5 | NE | 0.2 | ND | clear | |
| ll Apr | 1338 | E | 1.9 | 1.6 | 1.6 | SW | 10-15 | SW | 0.6-0.9 | ND | pc. | 2.8 |
| 27 Apr | 2355 | E | 6.0 | 5.0 | 5.0 | NE | 0-5 | NE | 0.2 | ND | clear | 2.0 |
| 11 Apr | 1425 | W | 2.0 | 1.8 | 1.8 | SW | 10-15 | SW | 0.6-0.9 | ND | ovc. | 3.0 |

Appendix 13. Continued.

| | _ | | Wate | r t em p | (C) | W | ind | Wav | es | Cur- | | Sec- chi |
|------------------|------------------------|--------------|--------------|-----------------|-------------|--------------|----------------------|--------------|------------|------------------------|---------------------|-------------|
| Date | Start time (EST) | Sta- tion | Sur- face | Mid- depth | Bot- tom | Dir. from | Speed (mph) | Dir. from | Ht. | rent (Dir. from) | Weather | disc (m) |
| 978 | - | | | | | | | | | | | |
| 27 Apr 10 Apr | 2314 1815 | W A | 6.0 6.5 | 5.5 6.5 | 5.5 6.5 | NE NW | 0-5 15 -20 | NE SW | 0.2 0.9 | NTD S | clear ovc., rain | >1.0 |
| 12 Apr | ,2250 | A | 5.6 | 5.6 | 5.6 | SW | 10-15 | SW | 0.9 | s | clear | |
| 10 Apr | 1735 | В | 7.0 | 7.0 | 7.0 | NW | 15-20 | SW | 0.9 | S | ovc., rain | >1.0 |
| 12 Apr | 2217 | В | 5.5 | 5.5 | 6.0 | SW | 10-15 | SW | 0.9 | S | clear | |
| 10 Apr | 1917 | F | 5.0 | 5.0 | 5.0 | NW | 15-20 | SW | 0.9 | S | ovc., rain | >1.0 |
| ll Apr | 2122 | F | 6.0 | 6.0 | 6. 0 | SW | 10-15 | SW | 0.9 | S | clear | |
| 10 May | 1411 | С | 10.1 | 9.5 | 8.5 | ca | | cal | | ND | clear | 1.7 |
| 10 May | 2,300 | С | 8.5 | 8.5 | 7.7 | SE | 5-10 | NE | 0.2 | ND | clear | 2.0 |
| 10 May | 1336 | D | 8.1 | 8.1 | 8.1 | var. | | cal | | ND ND | clear clear | 2.0 |
| 10 May | 2325 | D | 10.5 | 10.0 | 7.5 | SE | 10-15 | NE cal | 0.3 | ND | pc. | ND |
| 10 M ay | 1620 | G | 10.4 | 9.5 | 9.4 | N | 0-5 | Cal | 111 | ND | pc. | ND |
| 25 May | 2042 | G | ND | ND | ND | ca | lm | cal | .m | ND | clear | |
| 10 May | 1546 | Н | 10.5 | 8.6 | 8.6 | N | 5-10 | cal | m | ND | pc. | 1.9 |
| 25 May | 2122 | н | 13.5 | 12.0 | 9.0 | ca | lm | cal | | ND | clear | |
| 10 May | 1150 | R | 9.7 | 9.2 | 8.3 | NW | 5-10 | var. | 0.3 | S | clear | 1.5 |
| 10 May | 2222 | R | 9.0 | 8.5 | 7.10 | SE | 5-10 | NE | 0.2 | ND | clear | |
| 10 May | 1255 | E | 7.2 | 6.7 | 6.6 | ca | lm · | var. | 0.2 | ND | clear | 2.7 |
| 25 May | 2314 | Ē | 14.0 | 9.5 | 6.0 | ca | .lm | cal | .m | ND | clear | |
| 10 May | 1500 | W | 8.8 | 6.5 | 6.0 | N | 0- 5 | cal | | ND | pc. | 2.0 |
| 25 May | 2222 | W | 14.0 | 12.0 | | | .lm | cal | | ND | clear | , , |
| 8 May | 1658 | Α | 11.9 | ND | 12.0 | SE | 0-5 | SW | 0.2 | S | clear | 1.5 |
| 8 May | 2345 | Α | 10.0 | ND | 10.0 | S | 5-10 | SW | 0.6 | S | clear | |
| 8 May | 1606 | В | 10.5 | ND | 10.0 | SE | 0-5 | SW | 0.2 | S | clear | 1.5 |
| 8 May | 2316 | В | 10.0 | ND | 10.0 | S | 5-10 | SW | 0.6 | S | clear | |
| 8 May | 1510 | F | 10.5 | ND | 10.0 | SE | 0-5 | SW | 0.2 | S | clear | 1.5 |
| 8 May | 2205 | F | 10.8 | ND | 10.8 | S | 5-10 | SW | 0.6 | S | clear | |
| 14 Jun | 1500 | С | 6.8 | 5.8 | 6.0 | NW | 5-10 | SW | 0.2 | SE | ovc. | 2.0 |
| 22 Jun | 2135 | Ċ | 16.0 | | 16.0 | SE | 0-5 | var. | 0.2 | ND | clear | |
| 14 Jun | 1420 | D | 6.3 | 5.8 | | N | 5-10 | NW | 0.3 | SE | ovc. | 1.6 |
| 22 Jun | 2210 | D | 16.5 | 15.0 | 11.0 | SE | 0 - 5 | var. | 0.2 | ND | clear | |
| 14 Jun | 1551 | G | 13.0 | 9.0 | 9.0 | N | 0-5 | NW | 0.3 | SE | ovc. | 2.0 |
| 22 Jun | 2313 | G | 17.0 | 16.5 | 13.5 | SW | 0-5 | var. | 0.2 | ND | clear | |
| 14 Jun | 1620 | н | 13.0 | 9.0 | 8.0 | N | 0-5 | NW | 0.3 | SE | ovc. | 2.0 |
| 22 Jun | 2349 | Н | 17.0 | | 11.5 | SW | 0- 5 | cal | m | ND | clear | |
| 14 Jun | 1340 | R | 6.0 | | 6.8 | NW | 5-10 | SW | 0.2 | SE | ovc. | 1.6 |
| 22 Jun | 2055 | R | 17.5 | | 14.0 | E | 0-5 | var. | 0.2 | ND | clear | |
| 14 Jun | 1255 | E | 12.0 | 5.0 | 4.5 | W | 0-5 | cal | l m | SE | ovc. | 2.0 |
| 23 Jun | 0137 | Ē | 16.5 | | 11.5 | S | 0-5 | cal | m | ND | clear | |
| 14 Jun | 1726 | W | 14.0 | | 11.0 | N | 5-10 | NW | 0.3 | SE | ovc. | 4.0 |
| 23 Jun | 0044 | W | 16.5 | | 10.0 | S | 0-5 | cal | | ND | clear | • |
| 14 Jun | 1630 | A | 10.0 | ND | 9.0 | NW | 0-5 | NW | 0.2 | N | ovc. | 0.6 |
| 13 Jun | 2307 | A | 14.0 | ND | 14.5 | NW | 10-15 | NW | 0.6 | N | clear | |
| 14 Jun | 1555 | В | 9.5 | ND | 9.5 | NW | 0-5 | NW | 0.2 | N | ovc. | >1.0 |
| 13 Jun | 2230 | В | 15.7 | ND | 15.7 | NW | 10-15 | NW | 0.6 | N | clear | ١. ٥ |
| 14 Jun | 1505 | F | 12.0 | ND | 11.7 | NW | 0-5 | NW | 0.2 | N | ovc. | 1.0 |
| 15 Jun | 2116 | F | 15.5 | ND | 16.0 | NW | 1 0- 15 | NW | 0.6 | N | clear | |

Appendix 13. Continued.

| | a | | Wate | r temp | (C) | W: | ind | Wax | <i>r</i> es | Cur- | | Sec- |
|------------------|------------------------|---|--------------|---------------|-------------|--------------|----------------|--------------|-------------|------------------------|---------|--------------------|
| Date | Start time (EST) | | Sur- face | Mid- depth | Bot- tom | Dir. from | Speed (mph) | Dir. from | Ht. (m) | rent (Dir. from) | Weather | chi disc (m) |
| 978 | | | | | | | | | | | | |
| ll Jul | 1404 | С | 8.0 | 8.0 | | var. | 0-5 | NW | 0.3 | ND | clear | 2.5 |
| ll Jul | 2230 | С | 11.0 | 9.0 | 6.5 | SE | 0~5 | E | 0.2 | ND | clear | |
| ll Jul | 1434 | D | 9.0 | 6.8 | 6.0 | var. | 0-5 | NW | 0.3 | ND | clear | 2.8 |
| ll Jul | 2259 | D | 9.5 | 8.0 | 6.0 | E | 0-5 | E | 0.2 | ND | clear | |
| ll Jul | 1528 | G | 9.9 | 7.8 | 8.0 | var. | 0-5 | cal | Lm | ND | clear | 2.9 |
| ll Jul | 2351 | G | 8.5 | 7.0 | 6.5 | SE | 0-5 | E | 0.2 | ND | clear | |
| ll Jul | 1556 | H | 8.5 | 7.0 | 7.0 | var. | 0~5 | cal | | ND | clear | 3.0 |
| 12 Jul | 0019 | H | 9.0 | 7.5 | 6.0 | SE | 5-10 | E | 0.2 | ND | clear | |
| ll Jul | 1332 | R | 12.0 | 8.0 | 7.0 | var. | 0-5 | NW | 0.3 | ND | clear | 2.0 |
| ll Jul | 2156 | R | 11.8 | 9.8 | 6.0 | N | 0-5 | E | 0.2 | ND | clear | |
| ll Jul | 1207 | E | 12.0 | 7.0 | 6.0 | var. | 0-5 | N | 0.3 | ND | clear | 1.5 |
| 12 Jul | 0154 | E | 11.5 | 9.0 | 5.3 | E | 5-10 | E | 0.2 | ND | clear | |
| ll Jul | 1647 | W | 14.0 | 10.0 | 5.5 | W | 0-5 | NW | 0.2 | ND | clear | 3.5 |
| 12 Jul | 0108 | W | 13.5 | 6.0 | 5.0 | E | 5-10 | E | 0.2 | ND | clear | |
| 10 Jul | 1410 | A | 14.0 | ND | 14.0 | N | 15-20 | NW | 0.6 | N | clear | 0.5 |
| ll Jul | 0022 | A | 10.5 | ND | 10.5 | var. | 5-10 | w | 0.3 | N | clear | |
| 10 Jul | 1750 | В | 14.0 | ND | 14.0 | N | 15-20 | NW | 0.6 | N | clear | 0.5 |
| 10 Jul | 2343 | В | 10.5 | ND | 10.5 | var. | 5-10 | W | 0.3 | N | clear | |
| 10 Jul | 1610 | F | 14.2 | | 14.2 | N | 15-20 | NW | 0.6 | N | clear | 0.5 |
| 10 Jul | 2232 | F | 9.0 | ND | 9.0 | var. | 5-10 | W | 0.3 | N | clear | |
| 9 Aug | 1340 | С | 21.8 | 21.8 | 22.0 | NW | 0-5 | SW | 0.6 | S | clear | 4.5 |
| 29 Aug | 2312 | Ċ | 23.5 | | 22.5 | S | 0-5 | W | 0.3 | ND | pc. | |
| 9 Aug | 1300 | D | 22.0 | 21.8 | | NW | 0-5 | SW | 0.6 | S | clear | 4.0 |
| 29 Aug | 2349 | D | 23.0 | | 22.0 | S | 0-5 | SW | 0.2-0.3 | ND | pc. | |
| 9 Aug | 1426 | G | 22.2 | 22.0 | | NW | 0-5 | SW | 0.6 | S | clear | 4.5 |
| 30 Aug | 0053 | G | 23.0 | 22.5 | 22.0 | SE | 5-10 | SW | 0.2-0.3 | ND | pc. | |
| 9 Aug | 1455 | н | 21.8 | | 21.8 | NW | 0-5 | SW | 0.6 | S | clear | 5.5 |
| 30 Aug | 0127 | Н | 22.5 | 22.5 | | SE | 5-10 | SW | 0.2-0.3 | ND | pc. | |
| 9 Aug | 1220 | R | 22.8 | 21.8 | | SW | 0-5 | SW | 0.6 | S | pc. | 3.5 |
| 29 Aug | 2236 | R | 24.0 | 24.0 | 23.0 | S | 0-5 | NW | 0.2-0.3 | ND | pc. | |
| 9 Aug | 1640 | E | 21.5 | 18.8 | 7.5 | N | 5-10 | var. | 0.3 | s | clear | 4.5 |
| 30 Aug | 0318 | E | 22.0 | | 17.0 | S | 0-5 | | 0.2-0.3 | ND | pc. | |
| 9 Aug | 1553 | w | 21.8 | 18.0 | | N | 5-10 | var. | 0.3 | S | clear | 6.0 |
| 30 Aug | 0227 | W | 22.5 | | 22.0 | S | 0-5 | | 0.2-0.3 | ND | pc. | |
| 9 Aug | 1632 | A | 25.2 | ND | 2.52 | SW | 0-5 | s | 0.3 | S | clear | 0.8 |
| 9 Aug | 0008 | A | 21.5 | 21 5 | 21.5 | S | 10-15 | SW | 0.6 | S | clear | |
| 9 Aug | 1603 | В | 22.0 | ND | 21.5 | SW | 0-5 | S | 0.3 | S | clear | 0.8 |
| 9 Aug 8 Aug | 2342 | В | 21.5 | | 21.5 | S | 10-15 | SW | 0.6 | S | clear | 5.5 |
| 9 Aug | 1505 | F | 23.0 | ND | 22.5 | SW | 0-5 | S | 0.3 | S | clear | 0.8 |
| 8 Aug | 2245 | F | 21.0 | | 21.0 | S | 10-15 | SW | 0.6 | s | clear | |
| 12 Sep | 1412 | С | 26.9 | 26.1 | 24.2 | SE | 5-10 | SW | 0.2 | ND | ovc. | 2.5 |
| 12 Sep 12 Sep | 1332 | C | 29.1 | | 17.5 | E | 10-15 | SW | 0.2 | ND | ovc. | 3.5 |
| 28 Sep | 2202 | D | 17.0 | | 16.5 | NE | 0-5 | N | 0.3-0.6 | ND | pc. | |
| 12 Sep | 1459 | G | 26.0 | | 26.0 | NE | 5-10 | SW | 0.3 | ND | pc. | 3.0 |
| 28 Sep | 2030 | G | 16.5 | | 16.5 | NE | 0-5 | NE | 0.3-0.6 | ND | pc. | |

Appendix 13. Continued.

| | | Start | | Wate | r temp | (C) | W | ind | Wa | ves | Cur- rent | | Sec- chi |
|-----|-----|-------|---|--------------|--------|-------------|--------------|-------------|--------------|---------|--------------|------------|-------------|
| Da | te | time | | Sur- face | | Bot- tom | Dir. from | Speed (mph) | Dir. from | Ht. (m) | (Dir. from) | Weather | disc (m) |
| 978 | | | | | | | | | | | | | |
| 12 | Sep | 1529 | н | 24.8 | | 19.0 | NE | 5-10 | S | 0.3 | ND | pc. | 3.5 |
| 28 | Sep | 2105 | H | 16.5 | 16.5 | | NE | 0-5 | NE | 0.3-0.6 | ND | pc. | |
| | Sep | 1,216 | R | 24.0 | 23.8 | - | SE | 0-5 | SW | 0.3 | ND | ovc., rain | 2.0 |
| | Sep | 1721 | E | 23.3 | 19.8 | 9.1 | NE | 20-25 | NE | 1.2-1.5 | ND | ovc. | 3.0 |
| 12 | Sep | 1622 | W | 24.0 | 20.1 | 9.9 | NE | 20-25 | NE | 0.9 | ND | ND | 3.5 |
| | Sep | 1615 | A | 28.5 | 28.2 | | s | 0-5 | SW | 0.2 | s | clear | >1.0 |
| | Sep | 2147 | Α | 27.0 | 27.0 | | SE | 5-10 | SW | 0.2 | S | clear | |
| | Sep | 1540 | В | 26.3 | | 26.3 | S | 0-5 | SW | 0.2 | S | clear | > 1.0 |
| | Sep | 2118 | В | 25.0 | ND | 25.5 | SE | 5-10 | SW | 0.2 | S | clear | |
| 11 | Sep | 1445 | F | 25.5 | 25.5 | 25.5 | S | 0-5 | SW | 0.2 | S | clear | 1.0 |
| 11 | Sep | 2020 | F | 25.6 | 25.6 | | SE | 5-10 | SW | 0.2 | S | clear | |
| | 0ct | 1725 | Α | 14.4 | ND | 14.7 | S | 15-20 | SW | 0.9 | S | pc. | 0.8 |
| | 0ct | 2225 | Α | 14.0 | 14.0 | | S | 15-20 | SW | 0.9 | S | clear | |
| | 0ct | 1445 | В | 14.4 | 14.4 | | S | 15-20 | SW | 0.9 | S | pc. | 0.8 |
| 9 | 0ct | 2200 | В | 13.5 | 13.5 | 13.5 | S | 15-20 | SW | 0.9 | S | clear | |
| | Oct | 1545 | F | 14.5 | ND | 14.2 | S | 15-20 | SW | 0.9 | s | pc. | 0.8 |
| | 0ct | 2105 | F | 13.8 | ND | 13.5 | S | 15-20 | SW | 0.9 | S | clear | |
| | Nov | 1610 | A | 9.6 | 9.6 | 9.6 | NE | 5-10 | var. | 0.2 | NW | ovc. | >1.0 |
| | Nov | 0020 | Α | 10.0 | 10.0 | | ca | | NW | 0.3 | ND | ovc. | |
| 16 | Nov | 1550 | В | 9.0 | 9.0 | 9.0 | NE | 5-10 | var. | 0.2 | NW | ovc. | >1.0 |
| | Nov | 2355 | В | 9.0 | 9.0 | 9.0 | ca | | NW | 0.3 | ND | ovc. | |
| | Nov | 1507 | F | 8.5 | 8.5 | 8.5 | NE | 5-10 | var. | 0.2 | NW | ovc. | >1.0 |
| 15 | Nov | 2300 | F | 8.5 | 8.5 | 8.5 | ca | l m | NW | 0.3 | ND | ovc. | |

Appendix 13. Continued.

| | C+ | | Wate | r temp | (C) | W | ind | Wa | ves | Cur- | | Sec- |
|--------|------------------------|---|--------------|---------------|-------------|--------------|-------------|--------------|---------|------------------------|---------|--------------------|
| Date | Start time (EST) | | Sur- face | Mid- depth | Bot- tom | Dir. from | Speed (mph) | Dir. from | Ht. | rent (Dir. from) | Weather | chi disc (m) |
| 979 | • | | | | | | | | | | | |
| 10 Apr | 1038 | С | 4.0 | 4.0 | 4.0 | N | 5-10 | NW | 0.6 | ND | ND | 0.5 |
| 19 Apr | 2132 | Č | 6.5 | 6.5 | 5.5 | NE | 5-10 | NE | 0.2 | ND | clear | 0.5 |
| 10 Apr | 0944 | D | 2.5 | 2.5 | 2.8 | ca | | NW | 0.6 | ND | clear | 0.8 |
| 19 Apr | 2210 | D | 5.5 | 6.0 | 6.5 | SE | 5-10 | E | 0.2 | ND | clear | |
| 10 Apr | 1300 | G | 3.0 | 3.0 | 3.0 | NE | 5-10 | N | 0.6 | ND | pc. | 0.4 |
| ll Apr | 0119 | G | 2.5 | 2.5 | 2.5 | E | 5-10 | N | 0.3 | SE | clear | |
| 10 Apr | 1348 | н | 2.5 | 2.5 | 2.5 | NE | 10-15 | N | 0.6 | ND | ovc. | 0.5 |
| ll Apr | 0215 | H | 2.5 | 2.5 | 2.5 | SE | 5-10 | N | 0.3-0.6 | SE | pc. | |
| 10 Apr | 0903 | R | 3.0 | 3.0 | 3.0 | S | 0-5 | NW | 0.3 | ND | ND | 0.5 |
| 19 Apr | 2020 | R | 6.5 | 6.5 | 6.0 | NE | 5-10 | NE | 0.2 | ND | clear | 0.5 |
| 10 Apr | 1138 | E | 2.5 | 2.0 | 2.0 | N | 5-10 | NW | 0.6 | ND | pc. | >1.0 |
| 10 Apr | 2344 | Ē | 2.5 | 2.5 | 2.5 | SE | 5-10 | N | 0.3-0.6 | ND | clear | |
| 10 Apr | 1456 | w | 2.0 | 2.0 | 1.8 | NE | 10-15 | N | 0.6 | ND | pc. | >1.0 |
| ll Apr | 0336 | W | 1.5 | 1.5 | 1.5 | SE | 10-15 | NE | 0.6-0.9 | SE | pc. | |
| 12 Apr | 1535 | A | 9.5 | ND | 9.5 | SE | 5-10 | SW | 0.3 | S | clear | 0.2 |
| ll Apr | 2345 | A | 4.0 | 4.0 | 4.0 | E | 10-15 | ca | lm | N | ovc. | |
| 12 Apr | 1510 | В | 7.7 | ND | 7.7 | SE | 5-10 | SW | 0.3 | S | clear | 0.2 |
| ll Apr | 2304 | В | 4.0 | 4.0 | 4.0 | E | 10-15 | ca | lm | N | ovc. | |
| 12 Apr | 1400 | F | 8.0 | 8.0 | 8.0 | SE | 5-10 | SW | 0.3 | S | clear | 0.2 |
| ll Apr | 2155 | F | 4.0 | 4.0 | 4.0 | E | 10-15 | ca. | lm | N | ovc. | |
| 8 May | 1258 | С | 12.2 | 12.2 | 12.2 | SW | 25+ | SW | 0.9 | ND | pc. | 1.5 |
| 10 May | 0117 | С | 12.0 | 10.0 | 9.5 | S | 5-10 | ca. | lm | S | clear | |
| 8 May | 1330 | D | 11.0 | 11.0 | | SW | 20-25 | SW | 0.9 | ND | pc. | 1.5 |
| 10 May | 0025 | D | 11.6 | 9.9 | 9.9 | S | 5-10 | cal | lm | S | clear | |
| 8 May | 1429 | G | 11.0 | 11.0 | | S | 25+ | SW | 0.9 | ND | pc. | 1.5 |
| 9 May | 2132 | G | 13.4 | 10.5 | 10.5 | s | 5-10 | ca. | lm | S | pc. | |
| 8 May | 1458 | н | 10.9 | 10.9 | 10.9 | SW | 25+ | S | 0.9 | ND | pc. | 1.5 |
| 9 May | 2203 | н | 13.6 | 10.2 | 9.7 | S | 5-10 | ca: | lm | S | pc. | |
| 8 May | 1158 | R | 10.3 | 10.3 | 10.3 | SW | 25+ | SW | 0.9 | ND | pc. | 1.5 |
| 10 May | 0154 | R | 11.4 | 10.8 | 10.8 | S | 5-10 | cal | lm | S | clear | |
| 8 May | 1645 | E | 8.0 | 8.0 | 8.0 | S | 5-10 | S | 1.2-1.8 | ND | clear | 3.0 |
| 9 May | 2338 | E | 10.7 | 7.9 | 6.9 | S | 5-10 | ca. | | S | clear | |
| 8 May | 1550 | W | 8.0 | 8.0 | 8.0 | S | 25+ | S | 1.2-1.8 | ND | clear | 3.0 |
| 8 May | 2252 | W | 9.0 | | 6.2 | S | 5-10 | ca. | | S | clear | |
| 7 May | 1830 | A | 15.0 | 15.0 | 14.5 | S | 20-25 | S | 0.6 | S | clear | >1.0 |
| 7 May | 2310 | A | 14.0 | 13.5 | | s | 20-25 | s | 0.6 | s | ND | |
| 7 May | 1800 | В | 14.5 | 14.5 | | S | 20-25 | S | 0.6 | S | clear | 1.0 |
| 7 May | 2245 | В | 13.0 | 13.0 | | S | 20-25 | S | 0.6 | S | ND | |
| 7 May | 1715 | F | 13.5 | 13.5 | | S | 20-25 | S | 0.6 | S | clear | >1.0 |
| 7 May | 2140 | F | 13.5 | 13.5 | 12.5 | S | 20-25 | S | 0.6 | S | ND | |

Appendix 13. Continued.

| | Start | | Wate | r temp | (C) | W | ind | Wave | es | Cur- | | Sec- |
|------------------|--------------|--------|--------------|--------------|--------------|-----------|--------------------|--------------|------------|---------------|----------------|------------------|
| | | Sta- | Sur- | Mid- | Bot- | Dir. | Speed | Dir. | Ht. | rent (Dir. | | chi disc |
| Date | (EST) | tion | face | depth | tom | from | (mph) | from | (m) | from) | Weather | (m) |
| 79 | | | | | | | | | | | | |
| 12 Jun | 1321 | C | 17.0 | | 16.5 | NW | 5-10 | NW | 0.3 | N | clear | 2.5 |
| 13 Jun | 0328 | C | 14.8 | | 13.0 | SE | 0-5 | SE | 0.3 | ND | ND | |
| 12 Jun 13 Jun | | D D | 17.0 14.8 | | 15.0 | N | 5-10 | NW | 0.3 | N | clear | 3.0 |
| 12 Jun | 0235 1446 | G | 17.2 | | 12.0 16.3 | SE NE | 5-10 5-10 | SE NE | 0.3 0.3 | ND N | ND clear | 3.0 |
| 12 Jun | 2112 | G | 16.0 | 15 0 | 14.0 | SE | 0-5 | SE | 0.3 | ND | ND | |
| 12 Jun | 1520 | H | 16.2 | | 14.5 | NE | 5-10 | NE | 0.3 | ND N | clear | 3.0 |
| 13 Jun | 0010 | H | 15.2 | | 13.0 | SE | 5-10 | SE | 0.3 | ND | ND | 3.0 |
| 12 Jun | 1215 | R | 17.4 | 17.2 | | NW | 5-10 | NW | 0.3 | N | clear | 3.0 |
| 13 Jun | 0402 | R | 14.3 | | 13.5 | SE | 0-5 | SE | 0.3 | ND | ND | 3.0 |
| 12 Jun | 1704 | E | 16.0 | 11.2 | 11.2 | NE | 5-10 | NE | 0.3 | N | clear | 4.0 |
| 13 Jun | 0146 | E | 16.0 | 15.0 | | SE | 10-15 | SE | 0.3 | ND | ND | |
| 12 Jun | 1610 | W | 16.0 | | 10.0 | NE | 10-15 | NE | 0.4 | N | clear | 4.0 |
| 13 Jun | 0100 | W | 16.0 | | 11.8 | SE | 5-10 | SE | 0.3 | ND | ND | |
| ll Jun | 1745 | Α | 18.5 | ND | 18.0 | N | 0-5 | N | 0.4 | N | clear | > 1.0 |
| l2 Jun | 0100 | Α | 16.5 | ND | 17.0 | var. | 0-5 | var. | 0.2 | N | clear | |
| ll Jun | 1707 | В | 18.5 | ND | 18.0 | N | 0-5 | N | 0.4 | N | clear | > 1.0 |
| l2 Jun | 0025 | В | 16.5 | ND | 17.0 | var. | 0-5 | var. | 0.2 | N | clear | |
| ll Jun | 1525 | F | 18.0 | ND | 17.0 | N | 0-5 | N | 0.4 | N | clear | > 1.0 |
| ll Jun | 2300 | F | 17.0 | ND | 17.5 | var. | 0-5 | var. | 0.2 | N | clear | |
| 10 Jul | 1313 | С | 19.0 | 17.5 | | cal | | calm | | ND | clear | 4.8 |
| ll Jul | 0002 | | 21.1 | 17.7 | | SE | 5-10 | S | 0.2 | 0 | pc. | |
| 10 Jul | 1345 | | 19.0 | 17.5 | | cal | | calm | | ND | clear | 4.0 |
| 10 Jul 10 Jul | 2322 1441 | D G | 21.0 20.0 | 18.2 18.5 | | SE cal | 5-10 .m | S calm | 0.2 | 0 ND | pc. clear | 4.8 |
| 0 Jul | 2025 | G | 22.7 | 17.8 | 17 1 | SE | 0-5 | 227- | | 0 | | |
| 10 Jul | 1511 | | 18.8 | 18.0 | | SE cal | | calm calm | | ND | clear clear | 5.0 |
| 10 Jul | 2054 | | 21.8 | 17.5 | | SE | .ш 0 - 5 | calm | | ND | clear | 3.0 |
| 0 Jul | 1211 | | 19.0 | 18.0 | | cal | | calm | | ND | clear | 4.5 |
| l Jul | 0036 | | 20.8 | 19.0 | | S | 5-10 | S | | 0 | pc. | |
| lO Jul | 1657 | E | 20.0 | 15.0 | | cal | .m | calm | 1 | ND | clear | 7.1 |
| lO Jul | 2238 | | 20.5 | 17.4 | | SE | 5-10 | calm | | 0 | clear | |
| 10 Jul | 1604 | | 20.0 | 15.0 | | cal | | calm | | ND | clear | 7.3 |
| 10 Jul | 2143 | | 20.5 | 16.0 | | SE | 0-5 | calm | - | 0 | clear | |
| ll Jul | 1610 | A | 25.5 | ND | 22.5 | cal | m | calm | l | S | clear | > 1.0 |
| ll Jul | 2300 | | 21.4 | | 21.4 | cal | | calm | | ND | clear | |
| ll Jul | 1515 | | 25.3 | | 22.5 | cal | | calm | | S | clear | > 1.0 |
| ll Jul ll Jul | 2218 | | 21.7 | | 21.3 | cal | | calm | | ND | clear | . 1 0 |
| ll Jul | 1410 2115 | | 24.0 22.0 | | 23.5 21.5 | cal | | calm | | S NTO | clear | 1.0 |
| | | | | | | cal | | calm | | ND | clear | |
| 8 Aug | 1305 | | 23.5 | 23.5 | | NW | 5-10 | NW | 0.6 | N | clear | 4.2 |
| l6 Aug 8 Aug | 2205 1336 | | 21.0 24.2 | 19.5 | | NE NU | 5-10 5-10 | var. | 0.3 | ND N | ovc. | / ₂ O |
| o Aug lo Aug | 2131 | | 21.5 | 23.0 19.5 | | NW NE | 5-10 5-10 | NW var. | 0.6 0.3 | N ND | clear ovc. | 4.0 |
| | | | 24.0 | | 23.7 | NW | 5-10 | NW | 0.6 | ND N | pc. | 4.5 |

Appendix 13. Continued.

| | Start | | Wate | er temp | (0) | ٧ | Vind | Wa | ves | Cur- | | Sec- |
|------------------|--------------|---|--------------|---------------|--------------|--------------|--------------|--------------|------------|------------------------|-------------------|--------------------|
| Date | time | | | Mid- depth | | Dir. from | Speed (mph) | Dir. from | Ht. | rent (Dir. from) | Weather | chi disc (m) |
| 79 | | | | | | | | | | | | |
| 16 Aug | 2307 | G | 19.7 | 19.7 | 19.1 | NE | 5-10 | var. | 0.3 | NW | ovc. | |
| 8 Aug | 1501 | H | 23.8 | | 22.4 | N | 5-10 | NW | 0.6 | N | clear | 4.0 |
| l6 Aug | 2349 | H | 19.5 | | 19.0 | NE | 5-10 | var. | 0.3 | ND | ovc. | |
| 8 Aug | 1245 | R | 24.5 | | 24.5 | NW | 5-10 | NW | 0.6 | N | clear | 3.0 |
| 16 Aug | 2031 | R | 20.8 | 20.8 | 18.8 | E | 5-10 | var. | 0.3 | ND | ovc. | |
| 8 Aug | 1553 | E | 22.5 | 14.8 | 7.5 | N | 5-10 | NW | 0.6-0.9 | N | clear | 7.0 |
| 17 Aug | 0108 | E | 19.5 | | 19.5 | E | 10-15 | SE | 0.3-0.9 | ND | ovc. | |
| 8 Aug | 1649 | W | 22.0 | | 7.0 | N | 0-5 | N | 0.6 | N | clear | 7.5 |
| 17 Aug | , | W | 20.0 | | 19.7 | E | 5-10 | SE | 0.3-0.6 | ND | ovc. | |
| 8 Aug | 1720 | A | 26.0 | 26.0 | 26.0 | N | 15-20 | NW | 0.6-0.9 | N | pc. | >1.0 |
| 8 Aug | 0035 | A | 23.7 | ND | 23.7 | SE | 0-5 | var. | 0.3 | S | clear | |
| 8 Aug | 1645 | В | 25.6 | | 25.0 | N | 15-20 | NW | 0.6-0.9 | N | pc. | 1.5 |
| 7 Aug | 2350 | | 23.0 | ND | 23.0 | SE | 0-5 | var. | 0.3 | S | clear | |
| 8 Aug | 1540 | | 25.1 | | 25.1 | N | 15-20 | NW | 0.6-0.9 | N | pc. | 1.5 |
| 7 Aug | 2225 | F | 24.1 | ND | 23.8 | SE | 0-5 | var. | 0.3 | S | clear | |
| 12 Sep | 1323 | С | 20.0 | 19.5 | 19.5 | W | 0-5 | W | 0.3 | ND | ND | 5.0 |
| ll Sep | 2131 | С | 20.1 | 19.8 | 19.0 | SE | 5-10 | SE | 0.3 | SE | clear | |
| 12 Sep | 1352 | | 19.7 | 19.5 | | W . | 0- 5 | W | 0.3 | ND | clear | 5.0 |
| ll Sep | 2048 | | 21.5 | 20.0 | | SE | 5-10 | SE | 0.3 | SE | clear | |
| 12 Sep | 1448 | G | 20.0 | 19.5 | 19.5 | W | 0-5 | W | 0.3 | ND | pc. | 4.5 |
| ll Sep | 2222 | G | 20.0 | 20.0 | | SE | 10-15 | SE | 0.3 | SE | clear | |
| 12 Sep | 1516 | | 19.5 | 19.0 | | W | 0-5 | W | 0.3 | ND | pc. | 5.0 |
| Il Sep | 2254 | | 20.0 | 19.5 | | E | 10-15 | E | 0.3 | SE | clear | |
| 12 Sep | 1211 | | 19.0 | 19.0 | | W | 5-10 | W | 0.3 | ND | clear | 5.0 |
| ll Sep | 1937 | R | 21.0 | 20.5 | 18.5 | E | 10-15 | E | 0.3 | SE | clear | |
| 12 Sep | 1659 | | 20.0 | 15.0 | | W | 0-5 | W | 0.3 | ND | pc. | 5.0 |
| 12 Sep | 1607 | | 19.0 | 15.0 | | W | 0-5 | W | 0.3 | ND | pc. | 4.5 |
| ll Sep | 2342 | | 19.0 | 19.0 | | E | 10-15 | | 0.4-0.6 | SE | clear | |
| 12 Sep | 1620 | | 23.0 | ND | 22.4 | SE | 0-5 | var. | 0.9 | S | clear | >1.0 |
| 12 Sep | 2400 | A | 21.4 | ND | 21.1 | SE | 0-5 | cal | m | 0 | clear | |
| 12 Sep | 1533 | | 21.5 | ND | 21.0 | SE | 0-5 | var. | 0.9 | S | clear | >1.0 |
| 12 Sep | 2320 | | 20.8 | ND | 20.8 | SE | 0-5 | cal | | 0 | clear | |
| 12 Sep | 1405 | | 20.9 | ND | 20.5 | SE | 0-5 | var. | 0.9 | S | clear | >1.0 |
| 12 Sep 8 Oct | 2230 1715 | | 21.0 | | 20.6 | SE | 0 - 5 | cal | | 0 | clear | . 1 0 |
| 0 001 | 1/13 | A | 16.7 | ND | 16.7 | N | 0-5 | NW | 0.2 | N | pc. | >1.0 |
| 10 Oct | 2254 | | 14.2 | ND | 14.2 | S | 5-10 | W | 0.9 | 0 | ovc., rain | |
| 8 Oct | 1620 | | 16.0 | | 16.0 | N | 0-5 | NW | 0.2 | N | pc. | 1.0 |
| 10 Oct 8 Oct | 2205 1455 | | 13.8 14.2 | | 13.8 | S | 5-10 | W | 0.9 | 0 | ovc., rain | |
| 10 Oct | 2055 | | 13.2 | ND ND | 14.2 13.2 | N S | 0-5 5-10 | var. SW | 0.2 0.9 | N 0 | pc. ovc., rain | >1.0 |
| | | | | | | | | | | | | |
| 14 Nov | 1530 | A | 9.0 | ND | 9.0 | SW | 5-10 | W | 0.4 | N | pc. | 1.5 |
| 14 Nov | 1945 | A | 8.9 | ND | 8.9 | SW | 5-10 | W | 0.6 | S | ovc. | |
| 14 Nov | 1500 | В | 9.3 | ND | 9.3 | SW | 5-10 | W | 0.4 | N | pc. | 1.5 |
| 14 Nov 14 Nov | 1910 1415 | B | 8.9 | ND | 8.7 | SW | 5-10 5-10 | W | 0.6 | S | ovc. | , , |
| T→ MOA | 1413 | F | 7.6 7.3 | ND | 7.6 | SW | 5−10 10 | W | 0.4 0.6 | N S | pc. | 1.5 |